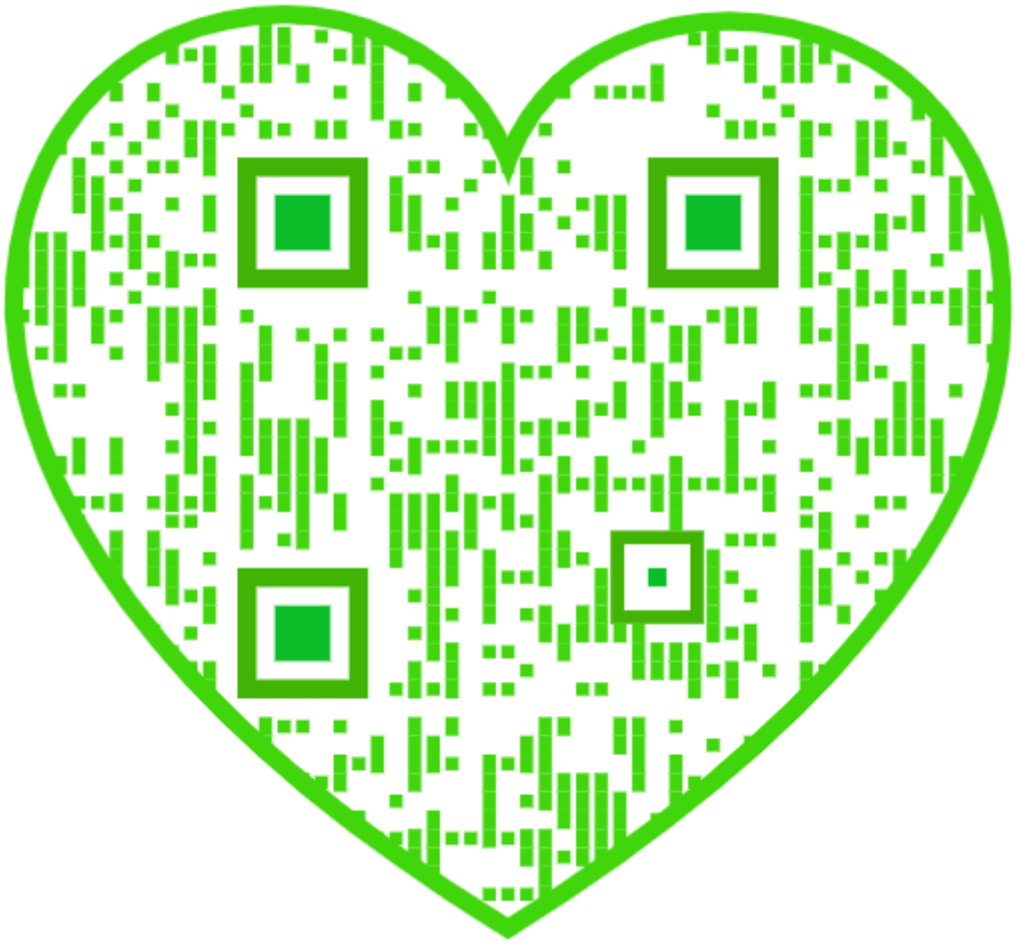

CLINICAL TALKS

ON

Minor Surgery

By

JAMES G. MUMFORD, M.D.

ASSISTANT VISITING SURGEON TO THE MASSACHUSETTS GENERAL HOSPITAL, AND INSTRUCTOR IN SURGERY, HARVARD UNIVERSITY MEDICAL SCHOOL.

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TO

MAURICE HOWE RICHARDSON, M.D.

In recognition of eighteen years of instruction in good surgery,
this little book is cordially inscribed by

THE WRITER

NOTE

THIS series of brief talks is the outcome of an intimate dealing as a teacher with medical students for some ten years, and a realization of certain of their needs. I have treated here of homely, commonplace subjects. Such subjects find little place in the text-books and lend themselves but feebly to brilliancy of demonstration.

The cases described and the printed words are reproductions of actual experience.

J. G. M.

29 Commonwealth Avenue,
Boston, May, 1903.

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Clinical Talks on Minor Surgery

LECTURE I

THE EXAMINATION AND STUDY OF CASES

Gentlemen: About twelve years ago, some one coined the phrase "antiseptic conscience." I think it was Dr. Kelly of Baltimore. That phrase and the thought it contains were once essential, because twelve years ago most of the men who were doing the surgery of the world belonged to the generation which in its youth knew the old sepsis. To them the principles and practice of antiseptic surgery came haltingly and often imperfectly. They had indeed need to cultivate the antiseptic conscience: but they had conscience for many other things, — great principles underlying good surgery, principles as important to-day as ever they were. One is impressed at times with the conviction that many of those sound, ancient

principles latterly are being pushed back into a very subordinate position.

To-day a majority of the surgeons in active practice have grown up with the antiseptic idea. In the course of their development, the antiseptic conscience has become part of their being. That intangible thing which we call *surgical instinct* includes and partakes of that same conscience. There is no danger of any man who has received his training in the past twenty years going far astray, with that conscience to prompt him. Every source of surgical infection has been so thoroughly and universally studied that, with one or two exceptions which I must speak of later, our technique is now perfect, or as near perfection as it is likely to become.

But there are those other principles which were so important to the former generations. Are you students of to-day aware of them? Is it not a fact that you have come to look upon asepsis as the one thing needful, and to feel that, asepsis being accomplished, there is nothing more to be done? Are you to be as good clinicians as were your surgical forebears? That is a question which your teachers often ask themselves; over which they hesitate in the answer.

If I name some of those general principles to which I refer they seem commonplace enough,

and most of you will say, perhaps, that you have them always in mind; but such is not by any means the conclusion of observers who watch the detail of work in our great hospitals.

The most important lesson which a surgeon has to learn is to estimate the patient's general condition. I put that, as essentially above any question of therapeutics. That matter of the general condition is a very large part of diagnosis. You have various routine questions which you ask in a perfunctory fashion: the patient's age, birthplace, residence, occupation, family history and previous condition of health, and in some sort you learn the answers, — but those answers are not idle babble; they have a very real bearing on the matter in hand. Here, in this surgical clinic, you are altogether too prone to assume that every case you see is an operative one pure and simple, and you look no further. Gentlemen, I am forced to admit and I admit it with chagrin, that the fault lies largely with us, your surgical teachers; it is one of the deplorable results of specialism gone mad. In the old days, it was required of the surgeon that he have a good practical working knowledge of general medicine. Operations were a last resort; John Hunter and Liston told their classes that the knife was an opprobrium, and should be used only when all other means

failed. Of course that extreme view has long ceased to prevail; — modified, first, by the introduction of anæsthetics and later by the development of asepsis. Indeed for long the pendulum was swinging the other way, when the knife was deemed the only reliable measure. Now, again, thanks to increased knowledge, we are appreciating that there are other resources.

Every one of those data which the clinical clerk takes down by rote may be of the greatest importance. Age may rule out many things, such as cancer, arteriosclerosis and the like; the place of birth and the race may suggest tuberculosis or malaria, as may the residence. The other day I saw a case of anthrax of which the diagnosis was rendered probable by the patient's surroundings ; there are numerous occupation diseases, — lead-poisoning and "housemaid's-knee" will at once occur to you. That matter of family history or hereditary tendency is important, in spite of the new light we are constantly getting on the whole question of etiology ; and especially the patient's previous condition of health is to be studied.

Here is a patient who illustrates in his own person many of the points we are considering. You see he is a young man. His age is twenty-three. He is of American parentage and of vigorous stock. He was born, reared, and now

works in a neighboring town, which has been notorious for its unwholesome location, — being low-lying, ill drained, and inadequately supplied with water. The young fellow is assistant to a sewer contractor, and spent most of last summer overseeing a gang of men engaged in laying drains. In September he became ill with typhoid fever, as appears from his physician's statement and the story he himself tells. Typhoid was epidemic in his town. Recovering, after an illness of some two months, he returned to work. After an interval of six months — that is to say, two or three days ago, — he was seized with acute pain in the region of the right shoulder. The pain increased, and is now very severe, — of a boring, throbbing, agonizing character. You see for yourselves that the patient looks like a sick man. He is flushed, with a coated tongue, the bowels are constipated, the urine is scanty and high colored. The man supports his arm in his hand; he favors it, as we say, and is evidently in great suffering. On examining him you find his pulse to be bounding and rapid, with a rate of 116, and a blood pressure recorded as 190 by the Riva-Rocci apparatus.

When you come to handle the arm, you find some slight swelling and a sense of bogginess about the shoulder joint; but the joint itself is not especially tender on pressure and the

patient seems to refer his pain rather to the head of the humerus.

Here is a very definite picture, gentlemen, On the history alone you should be able to make a correct diagnosis. The man is obviously the victim of an acute infectious process. He has been for long exposed to unsanitary conditions, and he has recently had typhoid fever. My assistant has just now found the leucocytosis in his case to be 40,000, and the temperature 104°F.

What are we to conclude from this collection of signs and symptoms? There are but two processes which suggest themselves at once — an acute articular rheumatism and an acute osteomyelitis. To distinguish between these two conditions is of the utmost importance. In the two diseases the signs and symptoms are in very many respects identical; but we have two points as guides: the bone rather than the joint is the seat of pain, and the patient has recently had typhoid fever. We know that acute infectious diseases are frequent precursors of osteomyelitis, and we are justified in concluding that we are dealing here with that process. A correct decision is urgent. The patient will be admitted to the hospital at once, the shaft of his humerus will be opened and drained, and he will doubtless recover with a useful arm. A few days' or even hours' delay

might mean for him a systemic infection, septicæmia, and death.

To take up the thread of our main topic again; there is that indefinable thing we call the patient's *General Condition*. Believe me, you cannot too soon begin to bear that thought constantly in mind. Old Sir Benjamin Brodie used to say that he could often make a diagnosis by the smell of a patient's bedroom. It is unnecessary for us to know such shrewd tricks as that, but you must learn to put all your senses into action. You come here to this clinic, fresh from your laboratory studies. Hitherto you have learned only the uses of the sense of sight, now you must cultivate your hearing, touch, and even smell, like old Sir Benjamin; and you must come gradually to appreciate that nebulous aura of physical condition which every man, sick or well, carries with him. When to these things you add those instruments of precision, the uses of which you are learning, there will be an accuracy and finality to your decisions which were impossible for the ancient men.

You will conclude from what I have said that a competent surgeon must be a very thoroughly-equipped all-round man. Exactly that is my meaning. You must study your general medicine as well as your surgery, and you must follow carefully both sets of clinics. There was

a time, fifty years ago and less, when all surgeons were general practitioners. Then with the development of specialties came a natural and proper narrowing of the surgeon's field. For years we devised new operations, we attacked organs previously regarded as inaccessible, we learned and perfected a new practice and a new technique. It has come about with this development of our branch of the art of medicine, that many diseases as well as organs have become the surgeon's own, his own in part at least, — diseases and organs with which he never thought to tamper a few years ago. So again it is becoming apparent that he must be familiar with a great variety of processes which, a few years ago, concerned him little if at all. In that second stage of the surgeon's development, he was often little more than a thorough anatomist and a clever handicraftsman. We have outgrown that stage. We now realize that the surgeon must know and be ready to apply the principles of physiology, chemistry, pathology, and bacteriology as well as those of anatomy and physics. He deals with almost every known disease and with every organ of the body. He must be familiar with the structure and function of those organs, the nature of their disease processes and the appropriate methods of treatment, if he is to put to their best and proper uses the therapeutic measures

with which he is especially equipped. He must not stand idly by until his medical confrère says "cut." He must cut when the time comes of course, but must use his now matured judgment to sustain the advice of his colleague.

Before now, following the old blind method, the chest has been opened for empyæma, when no pus was there; the appendix has been removed when typhoid fever was the cause of the symptoms, and the gall bladder has been opened for the cure of lumbricoid worms. I have even known a colleague to scoff at a surgeon who used a stethoscope, and to look upon a microscope as an instrument outside of his ken.

In all this, do not misunderstand me. A surgeon's duty is the treatment of disease by proper and recognized surgical measures; but he should have a sound knowledge of all disease as well, recognizing his own limitations; and while his medical colleague is at work with his proper investigations and remedies, the surgeon should stand by, waiting to be called upon for the employment of his own peculiar skill.

Given then the particular case, such as that of the man with osteomyelitis: You have looked the ground over, have ascertained the gravity of the general condition, and now turn your attention to the special lesion under consideration. That lesion is in the arm near the shoulder joint; and without further doubt you

make your diagnosis and recommend appropriate treatment. But take this other patient whom I show you as a foil to his fellow. He, too, is a young man, — not more than thirty-five; his previous condition of health is unimportant, and he, too, has a disease near the shoulder joint. It is in the nature of a swelling or tumor, and he has had it for some fifteen years. It is a chronic process, therefore.

When you see a swelling there are two questions which should suggest themselves to you at once: Is this an *inflammatory* process or is it a *neoplasm?* For the purposes of practical exclusion you run over rapidly in your minds the old formula which applies to acute inflammations — Is there pain, heat, redness, swelling, and impairment of function? In this case all of these are absent save swelling; moreover, this is a chronic process. Then you call up your other familiar formula which applies to a swelling — What is its exact location, size, shape, color, consistency? You must have these two formulæ always in mind; always on your tongue's tip, and be ready with your answers. This swelling has none of the characteristics of inflammation and the patient's general condition is excellent. Therefore it is probably a neoplasm and of a benign type. You say it is situated just below the acromion process over the middle of the deltoid muscle. It is about

the size of a small orange; it is spherical and uniform in outline; its color does not differ from that of the surrounding skin; it is soft, rather gelatinous to the touch, but it does not distinctly fluctuate. It is subcutaneous, movable, not adherent to the skin, and the adjacent glands show no metastasis.

Observe carefully the method of approaching your patient and handling the little mass. See that he sits or stands at ease before you, with a good strong light upon him while your own back is turned to the window. Gain his confidence by assuring him that you do not expect to hurt him. He will then sit relaxed and will not shrink or grow tense at your touch, — an important desideratum. Now pass your extended palm gently over the tumor, once or twice. In that way you will gain a great deal of information, and if the parts are sensitive, you will give no pain. The *tactus eruditus* does not belong to the heavy-handed surgeon. I cannot too strongly urge upon you the great advantage and importance of gentleness. Your patient will recognize it at once. He knows when he is being handled by a man who knows his business. The reputation of being a rough or brutal surgeon helps no one.

You will see the thoughtless, inexpert man plunge at a painful, sensitive region as though he were kneading dough. You can tell the

neophyte at once by his roughness. The gentle outspread palm and fingers of the examiner are extremely sensitive to tactile impressions and can be educated to a rare facility. It is seldom necessary to prod and poke with the finger tips.

Passing my hand over this tumor I readily define its outline, its extent, its density, its mobility, and I note the absence of sensitiveness. Now if I choose, I can pick it up in my finger-tips and determine, if necessary, its lack of fluctuation and the depth of its attachments.

That is the whole story. You have the list of benign tumors in mind and, running over them, you see at once that this must be a fatty tumor or lipoma. After all, it makes little difference what you call it. The method of your examination concerns us at present, and if you have learned to take a broad view of your case, to approach it without rush or flurry, and to observe accurately those few important details of which I have spoken, the giving a name and the assigning treatment will naturally and readily follow.

LECTURE II

INCISED WOUNDS

Gentlemen : Twenty years ago Mr. Sampson Gamgee published in London one of the very best books in English that is known to me, on the treatment of wounds and fractures.

After describing in some detail the pathological conditions which are met with in these phenomena, he goes on to lay down the cardinal principle of *support for the injured part*, and this he recognizes as the one essential in the therapeutics of traumatic surgery.

I shall have much to say as to the meaning of that word " support." In the time of Mr. Gamgee's writing, the word *asepsis*, in the modern sense, had hardly been invented; but it has now come not altogether justly to usurp the honors of surgical support; for in the consideration of all wounds, whether of the soft or hard parts, in which there has been any sort of disturbance of continuity, you should have constantly in mind that that severed continuity must promptly be restored; that those restored parts must be absolutely immobilized and sup-

ported, and that this work must be done under aseptic conditions.

I show you here a simple case in point. This man is a tinsmith, thirty years old, sound and vigorous. About two hours ago, while at his work, he cut through the skin and fascia of his palm, leaving as you see, a clean, straight wound, extending about three inches across the hand.

Let us see how we may apply our two principles, support and asepsis. We must regard what we have to do as a surgical operation. The whole field of the wound — and in this case the field is the man's hand — is sterilized, so far as may be in the manner with which you are familiar, — a thorough scrubbing with soap and water, followed by immersion in chlorinated soda and wiping with cotton sponges dipped in pure alcohol. The hand is then immersed for two minutes in an alcoholic solution of bichloride of mercury, 1 to 3,000. The hand and arm are then wrapped in a clean, steamed towel, and the patient sits before me with his arm outstretched, palm upward, upon the table. Meanwhile I have cleansed my own hands with soap, water and alcohol, and have put on rubber gloves, which have been sterilized by boiling. I have gone into this matter in some detail with you, because details in asepsis are the *sine qua non* of successful sur-

gery, and I do not expect to repeat again what I have just told you.

Let us now examine the wound. We must be sure always that no foreign substance remains in its depths, and in this case we find none. As I hold the wound open, you see the extensive tear in the palmar fascia. Perhaps I am overscrupulous in closing this, but I believe that by so doing I shall hasten the restoration of function. I close it, as you see, with three interrupted catgut stitches, using the curved needle rather than the straight one. That leaves me the skin wound of the palm, which lies together without gaping. The severed edges are dusted with a simple drying powder, aristol; a bit of crêpe lisse laid across and secured with collodion further supports them. I then apply a bit of absorbent cotton also held down with collodion about the edges, forming what we call the "cocoon dressing."

Now you will say that sufficient has been done to assure a prompt and sound healing by the first intention; but I ask you to observe that the second only of our cardinal principles has been applied up to this point. A reasonably accurate asepsis has been provided; why is not that sufficient, and why do I go on to apply the first principle — support and immobilization? A very simple experiment on your own fingers will illustrate the reason. If

you prick your finger sharply, tie an elastic band around it and let it hang down for a few minutes, you will find that the whole finger shortly will throb painfully, and the pricked wound will smart and ache. Now remove the rubber band, place the hand upon the opposite shoulder, and hold it there steadily; you will quickly experience relief and a sense of comfort. The series of phenomena which you have experienced are not dissimilar from what will occur in this man's wounded palm. Were I to leave his hand unprotected, except for the cotton and collodion, he would naturally swing it at his side. Almost at once the process of repair will have begun — there will be the inevitable increased blood supply in the wounded parts, a certain amount of exudation will go on, the venous circulation will be slightly impeded, and all these conditions will be accentuated by hypostasis, if his hand hangs down; in other words, the reparative process will be interfered with.

You know that hitherto we have been able to devise no means of disinfecting thoroughly the skin. The epidermis may be scrubbed and treated with chemicals until it is fairly free from micro-organisms, but the corium cannot be touched by such methods, and in the corium normally there are to be found pathogenic organisms, mostly the staphylococcus

epidermidis albus. You must bear in mind, too, that in the aseptic operations of surgery we have three principal sources of infection to consider: First, the instruments; second, the dressings and suture materials; and, third, the skin, whether of patient or operator. At the present time we have advanced so far that we have eliminated the first two sources. Instruments properly boiled carry no organisms; dressings and suture materials properly steamed and prepared are sterile. So we come to the third source, the skin. Even that to a large extent may be ruled out, for we now wear aseptic gloves,— surgeons and all assistants,— so that we are left with the patient himself as the one most important carrier of possible infection; and after the most scrupulous care in preparation, the patient's skin must carry in its deep parts pathogenic organisms, as we have seen. One asks, Why do not these bacteria always produce sepsis? Because to do so they must be present in great numbers, or else they must fall upon suitable soil, or both.

I need not review with you here the well-known fact that in varying degrees patients carry in their own tissues disease-resisting elements; suffice it only to remind you that organisms which will grow and multiply in and infect one man will fall harmless upon another; and here is your practical point, that in a great

many cases, by appropriate treatment you may help to bring nearer to immunity, you may fortify the resisting powers of your individual patient. There again, as I said at our last exercise, you see the importance of studying your patient's general condition.

So it is practically in the patient's own skin, and there chiefly, that we must look for a source of sepsis.

What became of these organisms at the time this man received this cut? Some of them were undoubtedly carried into the deeper parts, some of them still remain on the cut edges, and others will be forced into the wound itself and into the general circulation during the early hours of repair. Now this man's hand has been relieved of a large number of organisms by our antiseptics. We must strive to render the deep parts of the field infertile. No better medium exists for the growth of organisms than a stagnant or sluggish blood supply, and that condition exists to perfection when we leave the man's hand hanging at his side. I now place it high upon his chest and secure it in a sling.

We have now provided for asepsis and elevation. Is there anything further that may help to hasten his recovery? There is, and it is that surgical *immobilization* to which I have already called your attention.

If I leave the hand unconfined except by the light, supporting sling, there will be nothing to prevent his withdrawing it from the sling, and there will be nothing to prevent his using the hand and fingers even if elevated.

Here, again, you may ask, What harm can possibly result from such use? We have conceived of an exudation essential to the healing process in the palm; we have conceived of an increased flow of blood to the part; we can further see how the support of the arm has improved the venous circulation, and it takes very little imagination to understand how the action of the muscles dragging, pulling and contracting may well keep up an irritation which, superadded to the other conditions, will stimulate a bacteriological activity and initiate a sepsis.

These are involved conceptions, but are required to illustrate a condition which, after all, is simple enough; again we come back to our point and say that the one thing left and needful for the repair of this man's wound is immobilization.

Perfect immobilization, in the surgical sense, is far from being the simple thing you might suppose. It is not readily attained; and without giving careful thought to the anatomy of the parts, it cannot be attained. Take the instance of this man's wounded hand. What

are the important structures which go to make up the anatomy of the palm and adjacent parts? Obviously they are the skin and fascia, the underlying tendons and muscles, and the bones. We cannot keep the wound in a state of surgical rest unless we immobilize the adjacent structures, and that means that we must tie up the muscles of the part. Those muscles are the extensors and flexors of the hand, and their origin is about the condyles of the humerus and in the forearm, a fact elementary and obvious enough, but surprisingly overlooked often. So we must carefully bandage and restrain the movements of the forearm. Observe now a point which I must emphasize repeatedly. Never apply for immobilization a bandage close to the skin or over a thin intervening pad. Learn always to use elastic compression. You see that I now cover this patient's hand and forearm with six or eight layers of sheet wadding, — an elastic, very slightly absorbent material, which will not become caked and matted with perspiration. Between alternate layers of the wadding I place four strips of moistened mill board — two laid straight down the arm and two twisted spirally about it. These harden as they dry and lend an added stiffness and elasticity to the dressing. So far the application looks very cumbersome and unwieldy, but with this cotton roller I

now carefully and snugly bind the whole into place. I pull the bandage very tight, greatly diminishing the bulk of the dressing, so that when completed it appears to be of moderate proportions. If you handle the completed dressing you find that it is quite elastic to the touch, and that it exerts everywhere a perfectly equable compression. It controls absolutely the muscles; no movement can go on underneath it, yet it is extremely comfortable. It is tight, but it does not constrict. By its firm contact everywhere with the underlying parts it moderates and controls the circulation, but it does not occlude it. Here you have illustrated on a large scale the principles of compression which you apply when you seize and compress gently and bring comfort to your sore thumb, which throbs and aches with the beginning of a "run-round." So now you see employed the four remedies which you must learn to apply in the dressing of all wounds: asepsis, elevation, immobilization, and compression, and the last three imply *support*, — remedies which may be modified in degree often to suit special conditions, perhaps employed with over-scrupulous care in this particular case, but always important, always to be borne carefully in mind; to become as much a part of your instinct and training as that antiseptic conscience of which we have heard tell.

Here are two cases which illustrate the results of proper and improper treatment. This lad received a ragged four-inch wound of the wrist from falling on a broken bottle some ten days ago. The skin cut you see, but I must tell you — a fact not so obvious — that the superficialis volæ artery and one tendon of the flexor sublimis digitorum were severed. When brought in here, about three hours after the accident, the boy's arm was found tied up tightly with a knotted handkerchief, the wound gaping and ugly looking, where cobwebs — a favorite domestic remedy — had been smeared over it, blood still oozing from the artery, and the whole hand livid, swollen, and very painful.

The patient was laid on the operating table, the handkerchief removed, the arm elevated in the air and supported by an assistant for about five minutes, when the bleeding was found to have ceased, the swelling to have subsided, and the hand to be normal looking and painless. Then the whole arm and hand were cleaned and disinfected — washed, scrubbed, and soaked, as I have shown you, not dabbed at and mopped over with a futile corrosive sponge.

The two ends of the cut vessel were secured and tied with catgut, the severed tendon was united by fine silk stitches, the skin edges carefully and accurately approximated with four silver wire points, — which I prefer in the case of

these ragged cuts of the wrist, — and the hand and arm put up in the manner I demonstrated to you in the case of the tinsmith. In this case, of course, the wrist was secured in a position of slight flexion to relieve tension on the severed tendon. Since the day of the first dressing the patient has felt perfectly comfortable; his temperature has been normal and his bodily functions have been undisturbed. Twice during this time an additional tight bandage has been applied over the dressing, which had become somewhat loosened.

The apparatus has now been removed, and I call your attention to the appearance of the hand and arm. The entire limb is pale and shrunken. That is as it should be. The hand looks thin and normal, the fingers are flexible so far as I allow them to be moved. The wound is a simple red line — not puffy, not tender, not painful. The old cocoon dressing shows a little dry blood-stained exudate. I remove carefully the silver stitches which have admirably supported the irregular skin edges, and the wound is found practically healed. Of course there is more to the case. That tendon wound will be slow in healing, and the hand must be protected and supported for some weeks on that account, but so far as our simple incised wound is concerned it need trouble us no more. The dressing was *dry* and it was *in-*

frequently renewed. Napoleon's famous surgeon, Baron Larrey, was the great exponent of that method a hundred years ago. When you can find the time, read what he says in his delightful "Memoirs" on the subject of infrequent dressings.

Here is a man whose story is not so happy. He is a postman. Five days ago he received a cut on the back of the left forearm, being struck by a piece of falling window glass. The cut was about six inches long. Only the skin, thick fascia and some fibers of the muscles of the extensor group were cut. There was little bleeding. The wound was cleaned and covered in with the greatest care, but a supporting bandage and sling were omitted, at the man's request, as he said they would interfere with him and that he would be careful not to use his arm.

He reports here for the first time this morning, after five days of active running about, swinging the arm at his side. You see the state of his wound and compare it with that of the lad with the severed tendon. Here is a distinctly reddened area extending for an inch all about the cut, the edges of which are infected and slightly swollen. I remove one stitch and find it is followed by a drop of pus. The man says that the wound has ached for the past two days, and that he has felt "feverish"

and uncomfortable. We find his temperature to be 99.4° F., as you see. The arm has not the shrunken, cool, almost anemic look that we saw in the last case, but is distinctly warm and full. Fortunately, no great damage has been done as yet. By appropriate treatment the initial sepsis may be checked, but the man has delayed his convalescence by several days, and we have a series of troublesome dressings to occupy us, which I shall explain on a subsequent day.

So much for the three cases of simple incised wounds. They have been striking types and have told their own story, yet I must qualify that story in a few words, else you would leave this room with a false idea of the possibilities and limitations of our art.

All incised wounds carefully cleaned and put up with compression and elevation do not heal promptly, nor do all wounds, lacking that support, become septic. If there is any one thing true of surgical therapeutics it is that there is in it no place for dogma. Beware of the surgeon or physician who says, thus and thus shall it be done and no otherwise. Such precepts make of surgery an exact science, which it is not, and the men who presume to apply to it ironclad rules have to change their dogma from year to year.

But there are broad general principles which you will find safer than dogma. Two of those

broad principles I have shown you to-day; asepsis, rigid asepsis, must be your sheet anchor in all surgical work. Physiological support, immobilization, compression, next after asepsis, are essential for the safe and prompt healing of the great majority of wounds.

LECTURE III

SIMPLE FRACTURES

Gentlemen: Percival Pott fell down in a London street and broke his leg a hundred and thirty years ago. He got well and wrote about it, and since then surgeons have known more about fractures than they knew before. Pott's famous fracture marks an era in our annals. From that time to the present our knowledge has been growing more definite, until to-day, with x-ray plates for aid in diagnosis and the admirable book on treatment by our friend Dr. Scudder, there is small excuse for any surgeon's going far astray. Yet men, even the expert, do go astray. Probably there is no class of cases presented to us which is so easy of misapprehension, and in which the results of misapplied treatment are so deplorable. We have no time here for a general lecture on fractures, but I will speak to you now of two or three simple cases and illustrate the methods of handling them, of making the diagnosis, and applying a suitable treatment. I shall speak

only of closed fractures, or as they are more commonly called, simple fractures.

The analogy between lesions of the soft parts and of bones is a close one. The processes of repair are not dissimilar and the rules of treatment do not diverge greatly. But our analogy is incomplete in one important particular. In the case of severed soft parts union will take place though the apposition be imperfect, and though the united structures themselves be dissimilar, — with a delayed result, to be sure, and with more or less impairment of function; — there we have nature, unaided, working out her faulty solution of the problem. But in the case of a broken bone, our *art* must be carefully and constantly applied, if the injured member is to be restored to any sort of usefulness.

Here is a boy, sixteen years old, who while running fell against a curbstone about an hour ago, and injured his forearm. You see he supports the damaged limb with his hand and complains bitterly of pain half way between the elbow and the wrist. Let us proceed with our examination carefully and painlessly to him, so far as we can.

In the first place the patient's clothes are stripped off to the waist, thus allowing of easy inspection — an important point. In removing the various garments, slip off the coat sleeve

from the sound side first; then the injured arm can be uncovered without undue straining. Cut the shirt down the front and slip it off as you would a coat.

Allow both his arms to hang down, and observe any differences in them. You see that the affected arm hangs limp and motionless; the boy cannot raise it. It appears slightly swollen, and you may detect a slight backward bowing. So much for inspection.

Then compare the two arms by measurement. You see that on the sound side the distance from the tip of the olecranon to the ulnar styloid is ten inches. On the affected side it is nine and one quarter inches. Obviously there is a shortening of the bones; that means fracture. Is it a fracture of one or both bones? Of both certainly; for if the ulna alone were broken, the radius would act as a splint and maintain the length of the arm with little if any shortening. So you have very properly concluded that you have to deal with a fracture of both bones of the forearm, and so far you have caused not the slightest pain. It remains to locate the exact seat of the fracture. Now it may be necessary to hurt the patient somewhat, but if you proceed cautiously, he will bear it well. It is best to employ an assistant — two assistants are even better. The patient sits with his arm extended upon a table. One

assistant supports the elbow firmly, the other holds steadily the lower part of the forearm, making gentle traction; for there is spasm and contraction of the bruised muscles. I now run my hand gently up and down the arm and come at once upon this area of thickening, about five inches above the wrist. That area is the seat of fracture. Grasping the arm firmly above and below the injury, while the assistant continues to make traction, I mould the bones into position, reducing the over-riding where the distal fragments have slipped over and behind the proximal. While so moulding I experience that sensation of grating or crepitus of which you hear so much. While we keep up the traction you now see that the arm has been brought back to the same measurement as its fellow. If the spasm had been very strong and reduction of the fracture impossible without causing great pain, we should have given the patient an anæsthetic.

We come now to the difficult question of support and immobilization, for as John Hunter said, "The first and great requisite for the restoration of injured parts is rest." Shall we employ our cotton rollers and mill-board strips with elastic compression? That certainly would give rest to the parts, and it has at times been used with success in these cases. If this were the fracture of but one bone I should use

that dressing. As a rule, however, its very elasticity renders it unsafe when we need extension or traction to keep the bones from again over-riding. There are innumerable splint materials, from plain strips of wood to moulded gutta percha, wood fiber, felting, and plaster of Paris. The first of these, known among us as "splint wood," and the plaster of Paris, are convenient and are in common use. I shall use splint wood in this case, as the arm will probably swell, and such splints can be removed easily and readjusted.

There remain two other important points for you to consider before we apply the dressing. You can lay it down as a safe general rule in all fractures of the long bones, unless the fracture occurs close to the end of the bone, that the adjacent joints at either extremity must be immobilized, otherwise the play of the muscles would not be held in check and with the movements of the joints there would be a constant displacement of fragments. Moreover, without immobilizing the joints the required extension could not be maintained. In this case we must fix the elbow and the wrist.

The second point is that with fracture of both bones of the forearm and the possible large resulting calluses which sometimes form, the position must be such as to keep the shaft of the radius as far as possible from that of the

ulna, else all four wounded bone surfaces might become united in a common callus, and future rotation be impossible. In supination, with the palm turned upward, the shafts are well apart, in semi-pronation they are somewhat farther apart, in extreme pronation they are thrown close together, and if there be extensive laceration of soft parts it is possible even for the distal fragment of the radius to become united with the proximal fragment of the ulna.

In our present case I have the arm held firmly in semi-pronation and proceed to apply my splints — a simple matter after all this explanation.

The splints, of light, thin wood, should be a quarter of an inch wider than the forearm. The posterior splint extends from three inches above the fracture to the metacarpo-phalangeal joints; the anterior splint from the same point on the forearm to the middle of the palm, and a large crescentic groove is cut out of its side to avoid pressure on the thenar eminence. The splints are carefully padded with six sheets of wadding, with extra small pads on the anterior splint to conform to the contour of the wrist. Then an "internal angular" splint of moulded tin is similarly prepared to support the elbow.

While the arm is held steadily by an assistant, who stands on the patient's outer side, I apply these splints and fasten them firmly but

not tightly in place by four-inch adhesive straps, passed round one and a half times. There are three straps — one about the proximal end of the splints, one about the wrist, and one about the palm, embracing the posterior splint only. This last strap is very important, as by its firm pull on the posterior splint it keeps up traction. Then the elbow splint is applied with three straps — one at each end and one just below the bend of the elbow. The whole I cover with a cotton roller, snugly put on. That is a fairly comfortable dressing, but you must still be on the lookout for trouble. Keep the patient in sight for half an hour, and see that there is no return of pain before he leaves the hospital. Increase of pain, throbbing pain, especially if the fingers become swollen or blue, means that your splints are too tight. You must remove and reapply them. Then you must support the arm in a comfortable sling before sending the patient out. If he goes from the hospital in pain, you may be certain that he will suffer greatly before to-morrow, and the frequent swelling of the arm, against the immovable splints, will give rise to ugly skin sloughs.

So much for this familiar dressing which you see applied almost daily in our clinics. But the after-treatment — that is not always so easy; it calls often for the best judgment and, when neglected, may lead to serious deformity.

Moreover, these forearm fractures not uncommonly result in non-union, and against that you must guard.

One advantage of this use of open splints is that they are easily removed for inspection of the wound. I will ask this boy to return here daily for three days. If I find the arm painless, and the swelling not conspicuous, I shall then have him wait until a week from the accident has elapsed before I change the splints.

Here is another patient with a similar fracture ten days old, whom I have kept to show you. You see that on removing the bandage the position of the bones appears good, the swelling has subsided, and the plaster straps are a little loose. The splints are now off, and a slight callus is felt over the seat of fracture. The skin is shrunken and pale and the elbow and wrist are moved with some pain and difficulty. Here is your opportunity, if you want to help the union and hasten convalescence, to do a piece of work usually neglected, but for which your patient will bless you. Call in a competent masseur, if you can find one, and have him manipulate the elbow, the wrist and the tissues about the fracture for half an hour every day. The arm must be securely held on a firm cushion or on the padded table while the masseur is at work. He kneads the muscles about the joints, he loosens slight adhesions, he restores

the stagnant lymphatic circulation, he stimulates the circulation of the whole arm, and by thus improving the nutrition of the parts he hastens the union of the broken bones. If time permitted I could tell you more about this valuable measure of massage in fractures. I have employed it for years in such cases as have come under my care, and am constantly impressed with its advantages — in the hastening of repair, in the early restoration of function, perhaps best of all in the sense of well-being given at the time, and in the feeling of security and confidence so soon as the patient reaches the stage at which active movements begin to succeed these passive ones. Under the old-fashioned treatment the arm was like a prisoner confined for weeks in a dark, narrow cell, to emerge at the last, pale, timid, spiritless, broken-down, — who must wait weeks yet before his proper vigor returns to him. With massage you let in air and light upon your captive; his windows are thrown open daily and he is taken for a brisk walk, as it were, about the prison yard. At the end of his confinement he returns to the former life with his force but little abated and his zest sharpened for the work of the world.

LECTURE IV

LACERATED WOUNDS

Gentlemen: The first patient I have to show you this morning presents a condition calling for the nicest judgment.

He is a teamster, forty years old, sound and vigorous. Last evening while unloading his wagon he let fall a heavy iron bar, the end of which struck his calf and inflicted this ragged triangular wound. Some six inches of skin are torn up, the muscles are lacerated and the head of the fibula is exposed. The bleeding has been inconsiderable. At the time, he wrapped an old handkerchief about the leg, passed a painful night, and now comes here for treatment.

Forty years ago, in the days of the Civil War, such an injury might eventually have led to amputation; even now it is not without its dangers. Septic material has undoubtedly been carried deeply into the leg. The iron bar itself was unclean, and the man's well-worn, sweat-soaked working trousers are far from

aseptic, while the skin of the leg itself is loaded with organisms.

Two courses are open to us — to clean up the leg and the wound, apply wet antiseptic dressings, and look for a slow healing by granulation, or to bring the severed skin and soft parts back into place and try to obtain a prompt healing by primary union.

I shall adopt the latter course, and I believe that by the application of our two great surgical principles — asepsis and physiological rest — we may look for a good result. That pleasant old Frenchman, Le Dran, in 1735, used to tell his classes that in such cases as this he always tried for a primary union, because if that failed through *catching cold* in the wound he could take out his stitches and look for a second intention. I suppose that phrase "catching cold" is as old as Hippocrates.

Of course Le Dran's reasoning still holds good, though to us now such a method seems a half-hearted way to approach a surgical problem.

We begin our proceedings by etherizing the patient. It is cruel as well as stupid to attempt so painful and extensive a dressing as this without an anæsthetic. The leg is shaved and thoroughly scrubbed, then the wound is mopped out with peroxide of hydrogen, followed by bichloride alcohol 1 to 3,000. Bits

of torn clothing and dirt are picked out first, of course, and we are now ready to proceed. If you look carefully you see that these fragments of torn muscle are viable; they bleed easily and can be reunited. The sewing of them properly is very important for two reasons — because if left loosely flapping no good muscle union will result and the leg will be just so much weakened, and because the drawing of them together fills up the cavity between and prevents the collection of blood where it would serve as a culture medium in that "dead space." Here again I cannot forbear quoting wise old Le Dran, who said that in a deep wound in which the muscles were divided obliquely, the deep stitches should be passed so as to run parallel with the muscle fibers and not obliquely, as would be natural in sewing up an incised wound.

Then having closed in the deep parts, I lead into the bottom of the wound a single strip of absorbent tape or wick, placing it gently and loosely, that it may act as a drain and not as a cork. The skin is now drawn over the restored muscle and stitched into place with a half dozen silver or silkworm-gut stitches. The leg is again washed with bichloride alcohol and elevated in the air, thoroughly to drain the veins and promote freer circulation. Our asepsis is complete; now comes the second step — support and immobilization.

In this case we must bind the muscles from the toes to the middle of the thigh. First, I cover the wound with a handful of loose absorbent gauze, to act as a drain and reservoir for the inevitable discharges, then firmly and snugly I apply our mill-board and wadding rollers. You see how securely they hold the leg and how the knee and ankle both are immobilized without discomfort.

We cannot put the leg in an ordinary sling as we did the arm, but we can keep it elevated, and so add greatly to the patient's comfort. Of course this man must lie in bed for a few days. We swing a gauze hammock from a rod which is stretched from the headboard to the foot of his bed. In this hammock the whole leg rests, from foot to hip. That is a most satisfactory, comforting device. It gives us our required support and elevation, and as it swings, it allows the patient to shift himself about and even turn in bed without disturbing the wounded leg; for as the body moves the hammock swings, but the leg remains relatively at rest.

To-morrow the wick will be removed under the strictest aseptic precautions; the leg will be bound up again, and at the end of a week I hope to be able to show it soundly healed.

Ambroise Paré wrote to his *petit maistre* in 1580: "M. le Prince de la Roche-sur-Yon, who

dearly loved the king of Navarre, drew me aside and asked if the wound were mortal. I told him Yes, because all wounds of great joints, and especially contused wounds, were mortal;" and in the sequel the King of Navarre died.

Five years ago, a friend of mine, while leading a landing party on the coast of Cuba, was shot through the elbow by a Mauser rifle. The wound was properly dressed and supported, and in the course of a month the use of the arm was restored perfectly.

Here is an Italian who got mixed up in a scuffle last night. He came out of it with this ugly, ragged cut, which has nearly severed the insertion of the triceps tendon and has laid open freely the elbow joint from behind. As I hold the edges of the wound apart you see the articulating surface of the olecranon and a bit of the internal condyle. Let us attempt to save the arm with a useful joint.

The man is etherized, the arm carefully disinfected, and while an assistant holds the wound open I wipe out the joint with the little gauze sponges dipped in bichloride alcohol and then douche it thoroughly with sterilized water, taking pains all the time not to bruise or otherwise injure the serosa, lest I set up an adhesive inflammation which might lead to anchylosis.

Next, with fine chromicized catgut stitches, I sew up the rent in the capsule and unite accu-

rately the severed ends of the triceps muscle. In sewing up the capsule I have taken special pains to evert the edges, that no rough surface be turned into the joint to cause mechanical irritation. Then the skin wound is brought together, and covered in with gauze pads. In the final binding of this arm we have to meet a problem which differs from most of those encountered in the upper extremity. We cannot flex the elbow and support it in a sling, for by so doing we should run the risk of tearing the freshly-sewn triceps. So the arm is put up in extreme extension, with our mill-board strips to preserve fixation and plenty of cotton rollers to give elasticity and comfortable, even compression.

This man must not be allowed to go out with his arm swinging at his side. The wound is a serious one and demands great care for a few days. He will be put to bed and the arm kept at an angle of 45°, either on pillows or, as I prefer, in our gauze hammock.

A week ago to-day I was asked by a physician in a neighboring town to see a patient, with a view to an amputation. The man was suffering from a wound somewhat similar to this last one, but in the knee joint.

He had received his injury ten days previously. Not realizing its gravity, he had neglected to call a physician, contenting himself

with lying in bed and keeping the knee wet with applications of "listerine." My friend had seen him only a few hours before my visit. I found the patient to be a middle-aged, sturdy sea-captain. He was lying in bed and was evidently in pain. There was a punctured wound on the outer side of his right knee joint. The edges were gray and sloughy looking, and a thin pus could be pressed out through the opening. A culture from this discharge showed later a staphylococcus infection. The whole knee was red, boggy, tender, and swollen, the dimples on either side of the patella being obliterated, and the synovial pouch distended three fingers' breadths above the patella. The man's temperature that morning was 100° F., and his pulse 110; his face was flushed, appetite *nil*, and the picture that of a very sick man. There was present a leucocytosis of 26,000.

I agreed with my consultant that an amputation must be considered, but advised making an attempt first to save the leg. The patient was etherized, the leg cleaned up and the wound enlarged so as to admit of thorough exploration of the joint. The serosa was seen to be deeply injected, and several ounces of pus were evacuated, but the integrity of the joint apparently was not yet affected. The whole interior surface was carefully and laboriously mopped with peroxide of hydrogen and douched

with sterilized water. A counter-opening on the inner side of the patella was made for drainage and a tape was inserted in either wound. Then a large absorbent pad was placed about the knee, the leg thoroughly wrapped and supported after our familiar fashion — the dressing extending from the toes to the groin. The leg was slung in a hammock, a quarter grain of morphia hypodermically was administered, and the patient was left with careful directions that his bowels be kept open by salines and his strength supported by frequent liquid nourishment and a drink of Scotch whiskey three times a day.

Of course in this case we did not look for the restoration of a sound, flexible knee joint. The best outcome to be expected was the saving of the leg with a stiff knee. I did not hear of that man again until last night, when my friend again asked me to see him, and to do the dressing. The picture he presented was most refreshing. Except for pallor and feebleness, all evidence of sickness had left him, and he received me with the comfortable assurance that he was well. During the week the wicks had been changed three times by his attendant, and I now removed them for good and all. On taking off the dressing I found the leg pale and the skin shriveled in appearance, with the familiar contour of the joint restored. There

was slight though rather painful motion, which I did not encourage. The two wounds were granulating well. I replaced the apparatus, and do not expect to see the patient again.

This was a gratifying result. I attribute it to the man's remarkably good general condition, supplemented by the strict enforcement of our cardinal rules, — asepsis and support.

Let us look for one moment at this other man — the tinsmith, whose cut hand we sewed up ten days ago.

It has not been seen in the interval, though he has reported to assure us of his comfort and the absence of pain. Freed of its dressings, you see that the wound has healed *per primam*, as was to be expected. We shall confine the hand in a light bandage for five or six days longer and then send the man back to his work.

I am showing you good results only, but you must not conclude from them that surgeons are wizards. Bad results, unavoidably bad results, come often enough, and you will see a plenty. For the present, we are illustrating the constant saying of Ambroise Paré, "I dressed him, and God healed him."

LECTURE V

COMPOUND FRACTURES

Gentlemen: In connection with the subject of lacerated wounds I must say something to-day about compound fractures. They are no more than special varieties of lacerated wounds.

These fractures were regarded with extreme alarm in the old days, and are still not to be treated cavalierly. Chelius of Heidelberg wrote in 1821 that "the inflammation is always very great and requires strict antiphlogistic treatment, blood-letting, leeches, cold applications, and opium," and that mortification and delirium tremens may occur, especially in old people. " If sleep do not take place death is the consequence. On dissection frequently there is exudation on the arachnoid, pus in the joints and in the sheaths of the tendons." All of which, of course, results from the fact that we have to deal with a lacerated and easily infected wound, which involves a structure of low vitality.

Our effort therefore must always be to substitute a closed fracture for an open one, and

then to treat the damaged bone on the ordinary principles. Here again we come back to that matter of rigid asepsis and immobilization, the latter being of very great importance, for broken bones which are not held strictly at rest keep up an irritation of the wounded soft parts, delay healing, favor the continued outpouring of a sero-hemorrhagic exudate, and so provide a medium for the development of micro-organisms.

The young woman whom I show you was jostled against a moving cart six days ago, and her arm, thrust between the spokes of the wheel, was severely mangled. On being brought in here shortly afterwards, it was found that both bones of the forearm were broken in the middle third and that the two upper fragments were protruding through a hole in the skin on the dorsum. The house surgeon who dressed the case, very properly was not content with mere reduction of the fracture, but with pains and elaboration restored the continuity of all the severed parts. The wound was enlarged by free incisions, all bleeding completely checked, the bone fragments placed in apposition, the wound thoroughly douched with antiseptics, torn muscles and fascia sutured, the skin wound closed and the arm carefully dressed and secured in the wooden splints I have shown you.

This free opening and cleaning up of compound fractures is especially important when the forearm is involved, for in it non-union frequently occurs, owing to the interposition of muscle fragments, or tendons, between the ends of the bones.

In the present case the arm was bound firmly to the side to insure perfect rest. After recovering from ether the young woman experienced little pain; the next morning her temperature was 99° F. It never rose higher and we may presume fairly that the superficial wound has now healed satisfactorily. You see that on removing the dressings our presumption is justified. The skin wound is soundly healed; there is no swelling or redness, and we are left to treat the case as a simple fracture.

The next case was a much more difficult one, and illustrates a point which I made for you at our first exercise. This man is a brakeman, forty years old. Four months ago he had his left humerus broken by being crushed between two freight cars. The fracture was a compound one, but the external opening healed readily, and under a properly applied plaster of Paris dressing union of the bone was going on well, as we supposed. After a month, however, non-union was apparent, and after two months the condition had not improved. A careful investigation of the man's past his-

tory then revealed the fact that some five years ago he had a venereal sore, followed by an inguinal adenitis and a skin eruption, for which he submitted to about six months only of treatment. He was immediately put on to mercurials and iodides for a presumable syphilis, with the result that, after another month, fair union had been established and now we find his left arm as sound as its fellow. That question of an old syphilitic infection is never to be lost sight of in these cases of delayed union. The other more frequent general diseases which may complicate recovery are tuberculosis, diabetes, malaria and that indefinite thing which we call rheumatism, for want of a better name and understanding of its true nature.

Our third case was a more serious affair than either of the two preceding, but is interesting because it shows how bad may be the results which sometimes follow the careful conservative surgery of to-day.

The subject is a man of sixty who has all the appearance of having led a laborious life. He has an obvious arterio-sclerosis, though a thorough examination of the chest and kidneys elicits nothing abnormal. As old John Abernethy remarked on opening his surgical lectures a hundred years ago: "Now I say that local disease, injury, or irritation may affect the whole system, conversely that disturbance of

the whole system may affect any part." That ancient fact is the crux on which this case turns.

The man is a weaver. About six weeks ago his left hand was caught in his machine and severely torn at the wrist. The radius was fractured, the ulna dislocated, the wrist joint opened, the skin and other soft parts over the dorsum severely mangled, and he was brought in here with the hand hanging off, attached only by the skin and tendons of the front of the wrist. There again was the question of completing the amputation which the machine had begun, or of attempting to save the hand. I determined on the latter seemingly hopeless undertaking.

After the usual careful preparation, two loose fragments of the radius were removed, including the articulating surface, and the protruding end of the ulna was cut off, in order to convert the injury from a compound fracture and dislocation into a compound fracture, which would be more likely to heal than would the contused and lacerated joint. As a result of this removal of the ends of the forearm bones, we produced a partial resection of the joint, which would mean for us at best a hand with considerable impairment of motion. Then the torn tendons were secured, trimmed up and united, tape drainage was inserted, the skin wound sewn with silver wire, and the arm put

up in the mill-board apparatus. The patient was put to bed and the limb slung in a hammock.

The case went as badly as it could well have done. That night the patient's temperature was 100° F., and his pulse 100. The next morning the temperature and pulse were 101 and 90 respectively. The dressing was taken down, the skin stitches removed, and the wound cleaned up, but that night the temperature had reached 103° and the pulse 120. The next day, two days from the accident, the patient's condition was alarming. With temperature at 102° and pulse 112, he had every appearance of being thoroughly septic, as it is called. Evidently the wound was an active streptococcus factory, pouring pyogenic organisms and their products into the general circulation. This we must conclude, although as is so often the fact in similar cases, cultures of the man's blood were negative. The patient's arm showed a striking picture — such a picture, fortunately, as you seldom see in these days. The wound was sloughy looking, and exuded a thin saneous pus. The whole forearm and hand were swollen, tense, red, and shiny. The skin of the back of the hand was blue and necrotic looking, and it was evident that we had to deal with the inception of an acute gangrene

Not least significant was the patient's general appearance. He was hectic, anxious, and rest-

less, with that almost indefinable septic look, with saffron skin and injected conjunctivæ, which experience teaches us to associate with these alarming cases.

Of course there was but one thing to do. The rotting arm was killing the man, and it must be taken off. I amputated it about three inches above the limits of the old wound, left the flaps wide open for the sake of more complete drainage, and had the satisfaction,.the next day, of finding him established on the road to convalescence. The further story is uneventful.

You will scarcely find a case to illustrate better the extreme danger of some of these compound fractures, and the bearing which the patient's state of general health may have on the local lesion. Here the man's premature old age, and the general impoverishment of his system, consequent upon an inefficient circulation, were the underlying and salient features. He could put up no fight against the overwhelming bacterial invasion, and so capitulated only in time to save his life.

In a city the place to see compound fractures is at the general hospitals. You will rarely see these cases in private practice. Such injuries occur mostly among handicraftsmen, day laborers, and those persons engaged in extra-hazardous vocations, such as railway trainmen, linemen, roofers, firemen, and the like; and these

men when injured are commonly taken at once to a hospital. So, too, with any person in any walk of life who may be injured in a street accident — he is immediately hurried here by the zealous bystanders or police. It is fortunate that this is so, for in a hospital is found the fullest equipment to meet these emergencies, and a competent surgeon is always on hand.

The commonest and perhaps the most important of these compound fractures are mangled and lacerated hands. We see them here daily, and I am able to show you now a man suffering from such an injury. I say that these accidents to the hand are most important because serious crippling or loss of the hand means a loss of livelihood to the victim, and to the surgeon each of these cases means a fresh problem of very great interest. Every half inch of finger saved and every joint restored is of importance. Most of all the thumb, that distinctive mark of a higher evolution, is to be preserved if possible. The thumb without the fingers may still adorn a stump capable of grasping a tool and doing work, but a hand deprived of the thumb is a very futile member.

This present patient is a machinist, whose right hand was caught between cog-wheels this morning. We take off the bloody wrappings and find the conditions which you see — all four fingers mangled but the thumb unin-

jured. A flap of skin over the dorsum, with its pedicle towards the wrist, is torn up, disclosing the second and third metacarpal bones, which are fractured. The whole of the forefinger is mashed; the joints opened and the distal phalanx wanting, There is no prospect of saving that member, but the other fingers, though lacerated, may be saved, I believe. That hand means a study in reconstruction, and perhaps two hours of painstaking work at patching and mending. Ether and asepsis are our first steps, and those of you who will sit down here with the house surgeon at his task will see the exhaustive care he puts into it. All bleed ing is checked, every torn tendon is stitched and replaced, bits of destroyed tissue are trimmed away, hopelessly comminuted bone fragments are removed, each finger is treated as a separate problem and given its appropriate dressing, skin flaps are drawn up to cover exposed stumps and the forefinger is amputated at the middle of the first phalanx. When all this is accomplished satisfactorily the hand is spread out upon a well-padded splint, with dry gauzes about and between the fingers, and the limb to the elbow is put up in an abundant elastic-compression dressing. It is very important in this case, as in the case of the man with a cut palm, whom I showed you at our first exercise, that the muscles of the

forearm and hand be immobilized absolutely. We must have no dragging on these freshly united tendons and delicate, new forming tissues.

Then the arm is supported carefully in a sling or held high on the chest in a Velpeau bandage. If all goes well the patient may expect the use of his hand by the end of two months, but we can give him no such positive assurance. Skin flaps may lose their vitality; bones may suffer from osteo-myelitis and become necrotic; tendons may slough; sinuses leading to deep-seated inflammations may persist for weeks, and many and various minor, secondary operations may be necessary before we are through with this case. But the great preliminary care is worth the patient's while, and ours, for all that. With it we can promise him a useful hand; without it he would have to expect a crippled, helpless claw.

In connection with this subject of lacerated hands, I must warn you that you will find the treatment of lacerated feet a still more difficult matter. It is not because there is anything peculiar in the structure of the feet, but because, owing to their dependent position, their circulation, except in the case of the young and vigorous, is not so good as is that of the hands. That you must always bear in mind if you would avoid trouble for which you might justly be held to blame.

Take two similar cases — a man with a jammed thumb and a man with a jammed toe. You dress up the former and send him home, to find in the course of a couple of weeks that he is quite well. You dress the man with the jammed toe and send him off about his business, and what do you find? By the end of two weeks, in spite of oversight, the toe is far from healed: it is red, tender, and slightly septic; the whole foot is swollen and tender, and very likely there is a bit of necrotic phalanx to be felt. This untoward result is due to no lack of aseptic precautions on your part, but to the fact that you have failed to observe our second cardinal principle — support. You cannot safely send these patients out to knock about the streets. Either they must be put to bed with the leg elevated — the best thing by far — or they must be instructed to bear no weight on the foot and to keep it up on a chair or sofa except when necessarily in use. The point sounds like a small one, but it is salient.

So much for compound fractures — perhaps the most important division of traumatic surgery. We have but skirted the border of a great subject, but sufficiently near, I trust, to show that here, as in the lesser lesions considered, the same broad, inevitable principles constantly must be applied.

LECTURE VI

GRANULATING WOUNDS AND VARICOSE ULCERS

Gentlemen: There exists in the minds of students, and often of graduates as well, a confusion regarding ulcers and granulating wounds. It is a natural confusion, for the two conditions overlap and run into each other. An ulcer may be described as a superficial solution in continuity, which shows *no tendency* to heal; a granulating wound, as a solution in continuity, which shows a *tendency* to heal. Of course such a definition is a very general one, but it will answer our present purposes. You may see many examples of both lesions in this clinic, and you will find it difficult in some cases to decide with which you are dealing.

Ordinarily, however, there is no question when you are dealing with a granulating wound. You will see the red velvety granulations shrinking in area steadily, with little projections of new skin shooting in, and the process of repair so constant and inevitable

that you can appreciate the changes from day to day.

In regard to such a healthy granulating wound there are two questions which the student is always asking and about which he seems to feel that he gets very little light. With what applications shall it be treated, and how often shall the dressing be changed?

Ordinarily the answer to that first question is a very simple one when the wound is in a healthy individual. Take, for instance, the case of this woman. Her breast was removed for sarcoma some three weeks ago. The skin flaps were not drawn tightly together at one point, with the result that she has on the front of the chest, as you see, a superficial open wound about the size of a silver dollar. It is clean, flat, bright crimson, and does not bleed easily. It will heal over in a few days, no matter how you treat it, provided only, and this is important, provided you keep it clean. You can wash it with corrosive alcohol, or creolin, put on a gauze cocoon, and leave it for three or four days. When she comes in again the pad will be found moistened with pus, but the wound clean, and smaller than to-day. Such wounds as this require no special care.

On the other hand, take this case of a granulating wound on the back of the neck of this man. The patient is fifty years old and has

two per cent of sugar in his urine, for which he is under treatment. Two weeks ago he came in here and showed us on the back of his neck a carbuncle the size of an English walnut. I excised cleanly the carbuncle, and so stopped the process. There has been no return of the active local infection, but the wound has not healed readily. The raw surface, as large as the top of an egg cup, is still nearly as it was two weeks ago. The granulations are dark purple, soft, spongy, and bleed easily when handled. About the edges they overlap in fringes. That overlapping we call *exuberant granulations;* it is a perfectly harmless condition and is easily remedied. That is the condition known to the laity as "proud flesh," and is always referred to by them with horror — just why is not clear.

There are various methods of treating such granulations, but all methods come down to this, that the granulations must be trimmed down and the wound stimulated into proper activity so that it shall have the vigorous, healthy appearance which we saw in the case of the woman. With the scissors I cut off these redundancies, — they are absolutely insensitive, — and after checking the oozing by sponge pressure, I wipe over the whole wound with the stick of silver nitrate. Then a dry gauze dressing is applied. Every other day

the man will return, and we hope soon to see the wound closing in. Another excellent method of treating this wound, after trimming the granulations, is to dust it thickly with some simple drying powder, such as dermatol or aristol. But after all, what you must bear in mind is that the wound is to be kept clean and the granulations frequently trimmed down. Our familiar supporting bandage must never be omitted, for the pressure it exercises helps the circulation in the parts and prevents passive congestion and stagnation.

We are fortunate to have another patient here who presents a third type of granulating wound. He is a boy who received a severe kick on the shin about a month ago. The perisoteum and bone were not injured, but he showed us a superficial wound, long and narrow, as though you had torn up the skin for a distance of five inches with your finger nail. Three weeks ago this long, narrow wound, in the apparently healthy lad, began to be lined with the small, flat, dull, red granulations which you see, and thus it has remained. It refuses to heal. It has been scarified, curetted, and wiped frequently with the caustic, but without avail. We are now planning to have the lad get out into the country to see what out-of-doors life will do for him. Meantime I shall dress the wound daily with a stimulating

lotion on gauze and bandage the leg from toes to mid-thigh.

In such cases you will find diluted tincture of myrrh, one part in twenty of water, or pure balsam of copaiba, to be excellent. I have always been pleased, too, with the action of Gamgee's favorite application: Borax, 1 part; compound tincture of lavender, 8 parts; glycerine, 4 parts; water, 24 parts.

Such, briefly, are some of the methods of treating these open wounds. You will find in the books and be told by doctors of innumerable other lotions, ointments, and applications. Many of them doubtless are useful, certainly most of them are harmless; but, after all, what you have to remember is to keep the wound clean and give nature a chance.

In this connection I am prompted to give you a word of advice. You will come to find as undergraduates, and later as graduates, that there is a common tendency among certain men to sneer at measures and methods with which they are unfamiliar. Against such men be on your guard. They are almost as dangerous in their way as are the credulous ignorant. Their opinions are not founded on reason, but on sloth and indifference, and a certain tired skepticism born of sad experience. But theirs is not the truly scientific spirit which waits patiently for proofs. The

unreasoning sceptics are prone to translate an attitude of legitimate, cautious doubt into one of bumptious cynicism.

Now let me bring before you another class of cases, varicose ulcers, allied to granulating wounds, cases which are a weariness often to students and dressers, for by long continuance they become an opprobrium to these clinics. Yet they should not be a bore. These ulcers are very grievous afflictions to their victims, they belong to a very interesting class of pathological processes, and they heal under proper treatment.

For hundreds of years surgeons have talked and written about varicose ulcers, and the opinions of the best surgeons regarding their nature and treatment have always been correct, yet even to-day you sometimes see the cases drag on an interminable course, submitted to a treatment which is amazing and discouraging.

You may usually tell a varicose ulcer at a glance. It is on the shin, below the middle of the leg; above and about it are enlarged superficial veins, and commonly the leg is swollen more or less. In few lesions is the cause of the trouble as obvious as in these ulcers. Knowing the cause, you must remedy that, and in so doing attack the disease at its source. These ulcers are due to varicose veins, so you must

cure the varicose veins, or at least you must support and relieve them.

This is such a transparent truism that it seems as though it should be apparent to the meanest intellect, yet wise men are seen to pass it by. Think for a moment of what the process is. First, there arises the dilatation of the veins, a condition lasting perhaps for years; gradually as the walls of the veins become thinned and inelastic and their valves incompetent, a condition of stasis results. A thin serum oozes out into the surrounding tissues and causes the œdematous swelling. At the same time there is an exudation of red blood corpuscles, which produce an extensive pigmentation of the skin, associated not infrequently with an eczema. As a result of all this the nutrition of the leg is greatly impaired, and the ideal conditions favoring an inflammatory process with destruction of tissue are present. Sometimes as a result of thrombosis of the veins and malnutrition of the surrounding parts, a phlebitis or a periphlebitis is seen; there may even be rupture of a vein with serious hemorrhage; but more commonly, as a result of some slight blow, or even scratch, a superficial skin lesion is caused. This refuses to heal in the sodden tissues, bacteria rush in, and a destructive ulcer is formed.

It is for this ulcer that the victim seeks advice

at last. He seeks advice, and I regret to say that he sometimes is given plasters and washes, ostensibly for the eczema, I suppose. With your knowledge of the cause of his trouble you will say that such treatment is preposterous. It is preposterous, but you will see more than one patient so treated hitherto, come despairingly into this clinic.

Now let me show you one of these unfortunate patients. He is a man of forty-five; a day laborer; a man who stands constantly on his legs. The pain of his disease has disabled him utterly. You observe, in the first place, the great size of his calves and feet. He is not a large man; he weighs perhaps a hundred and sixty-five pounds, but his right leg, which is the seat of the ulcer, measures twenty inches. The whole leg below the knee is of a dark reddish-brown color, mottled and shiny. There the veins are disguised, but behind the knee in the popliteal space, and along the course of the internal saphenus you see the veins standing out in great bunches. Over the front of the shin and spreading back into the calf is this irregular ugly ulcer, as large as your outspread hand. Its edges are indurated and elevated, and it is lined with sloughy, dull red, flabby granulations. As the man says truly, it is a very sore leg.

I have had the patient lie down on the ex-

amining table for half an hour, with his leg supported at an angle of forty-five degrees. That has demonstrated two things. It has given us an idea of the extent of the swelling, for now we find the calf to measure but sixteen and one-half inches in circumference, — a shrinkage of three and one-half inches, — and it has given us an important clue as to treatment. Indeed, it has brought us back to our first principles, and shown us the importance of elevation and support. For let me tell you that the method by which most quickly to secure a healing would be to put the man to bed, to bandage properly the leg and swing it in a hammock. Thus the veins would be kept constantly emptied by the action of gravity; the circulation would be quickened and the nutrition re-established; the exudate would be absorbed in a few days and the ulcer would be converted into a granulating wound.

For various reasons such an admirable method of treatment may not be instituted in this case, so we must adopt the next best method, and on the whole it is the one most practicable in such cases.

In the first place, when there is any considerable œdema present, I always order the half hour of elevation. Thus we find that we have to deal with a leg of a more nearly normal size, with œdema diminished and veins emptied

of their accumulations. Next, to clean up the sloughy ulcer with its indurated border, I apply a gauze pad, wrung out of pure glycerine, overlapping the edges. The glycerine acts to draw out the serum from the tissues and rapidly softens the indurations. If you choose you may etherize the patient and curette the ulcer and its edges, but this rarely is necessary. Then from toes to mid-thigh I apply firmly, snugly, and with uniform elastic compression our wadding rollers of many thicknesses and a cotton bandage.

Now, whatever position the patient assumes, the veins cannot again become distended, the leg cannot swell, and the nutrition of the parts cannot seriously be disturbed. The patient will be directed to keep as quiet as possible for three or four days and to have his leg up on a chair most of the time, but within the week he will go back to work in some degree of comfort. To-morrow he will return to have the glycerine pad removed and the bandages reapplied. That his condition will then be satisfactory I hope to show you.

Meantime look at this second man, who is suffering from a similar ulcer and has been under treatment since the day before yesterday. He was dressed with our glycerine pad and supporting bandage, which has been once renewed. You see now a condition very differ-

ent from that of our control patient. The leg is still swollen and œdematous, but not markedly so. The veins are inconspicuous, and the ulcer itself, instead of being indolent and sloughly looking, is lined with red and fairly healthy granulations ; in other words, it is taking on the characteristics of a granulating wound. As for further treatment, the important thing is to continue our support, without which the lesion would quickly relapse into an ugly ulcer. To the granulations I shall apply sterilized absorbent gauze. Nothing else is needed, and by our continuing in this course I hope to show you, within three weeks, the wound nearly healed and the man going about in normal, comfortable fashion.

LECTURE VII

FELON, WHITLOW, PARONYCHIA, PALMAR ABSCESS

Gentlemen: You will find it hard to define the first three words which give a title to this exercise. *Felon* and *whitlow* have no proper etymological reason for existence; paronychia is derived obviously from *Παρά*, *around*, and *ὄνυξ*, *nail;* palmar abscess is self-evident.

I am making this seemingly needless talk about definitions because no two surgeons will be found to agree about the meaning of those first three words, and even the medical dictionaries are at loggerheads.

Felon means *one guilty of felony*, a *wicked, cruel person*, hence the word has been applied to a cruel infection. Whitlow means literally *a white flame;* " a painful inflammation tending to suppurate, in the fingers or toes." [1] That seems a fairly good definition. Very many surgeons regard *whitlow* as identical with *felon;* I do so myself, and as I find no great authority or even well-established custom to oppose me

[1] Chambers' Etymological Dictionary.

I shall continue to do so. Remember, then, that for us whitlow and felon are interchangeable terms.

But *paronychia* — there is our rock of offense, for fully half the authorities make it identical with whitlow and felon.[1] So we are left to follow our own fancies, and I have taken the liberty of following mine so far as definitely to contrive two definitions which I believe to be descriptive, convenient, and fairly accurate:

As whitlow is felon, and the latter word is in more common use, I shall drop the term "whitlow."

A felon is an acute infection of the finger (or toe), progressive, with a tendency to involve the bone.

A paronychia is an acute infection of the finger (or toe), progressive, situated near the nail, which it tends to involve.

Bear in mind that paronychia may spread further and involve the whole finger — in which case it should more properly be called a felon. And bear in mind also that the great majority of felons are situated over the terminal phalanx.

[1] Foster, Dunglison, Keating, Gould, and Duane group felon, whitlow, and paronychia under one head and call the hybrid affection "periphalangeal abscess." The Century Dictionary: "Felon, an acute and painful inflammation of the deeper tissues of the finger and toe, especially of the distal phalanx; generally seated near the nail."

This is only a beginning of the controversy. We could go on for an hour juggling terms and disputing as to what does or what does not constitute felon.

Conceive, then, of felon as an acute, progressive infection, situated anywhere on the finger. It may be superficial, it may be deep, it may be both superficial and deep. Take that last conception as an example of a common form of felon and examine the finger of this woman.

One week ago, as she tells us, she pricked her finger with a carpet tack. The little wound healed apparently, but after three days the end of the finger became red and the skin over the pulp elevated, somewhat in the form of an ordinary blister. But there was pain and there is pain now — throbbing, wearing pain. I tie a rubber tourniquet about the base of the finger and inject a few drops of two per cent cocaine along the course of each lateral nerve. Then with the scissors I trim off the blister. That leaves us with a red, mottled surface about the size of a silver dime. It looks like a granulating area. All the sero-pus contained in the blister has been evacuated, and you would suppose that here was an end of the affair. If now I take the finger in my hand and gently squeeze it you see a minute drop of pus exude slowly from a point in the granulations. That means that there is a little track connecting

the superficial cavity we have opened with a deeper cavity. This felon is a compound affair, with two pus chambers in tiers, one above the other. They are connected by the minute channel which was perhaps the original track of the carpet tack or maybe was caused by the inflammatory action itself.

This form of felon with its two chambers has been felicitously termed a "shirt-stud abscess." There may be two or more connecting channels, but the name is just as good. So, when you open a superficial felon, remember that a felon is progressive, and search for that second chamber. Now I open the deeper pocket, of course, and find myself on the periosteum. I clean out the little cavity; wipe it thoroughly with peroxide of hydrogen, lay in it gently a bit of absorbent tape, wrap the finger in a hot creolin poultice, bandage the hand and forearm with elastic compression, and suspend them in a sling.

In this place let me say one word about poultices. They have been used from time immemorial for the comfort they bring to the affected part. Their action is to stimulate the superficial circulation, and thus, by relieving congestion, to check inflammatory action and allay pain. Such a use of poultices is as comforting to-day as ever it was.

A poultice must supply *heat* and *moisture*;

deprived of either it is no longer a poultice. The materials of which poultices have been made are many, but mostly surgeons have tried to employ some vehicle which would retain heat. Such a vehicle is found in Indian meal, flaxseed and the various cereals. They remain moist and warm for a long time, but they are beautiful culture media. For a vigorous infection-spreading agent, recommend me to the old-fashioned bread and milk poultice.

With Listerism there came in the so-called antiseptic poultice. As commonly used it is not antiseptic. The best that can be said of it in that regard is that it is aseptic. When properly prepared it is a useful dressing, because it is sterile and because by supplying heat and moisture it stimulates the reparative processes. Then, too, it is easily applied.

So you see that in the use of the properly constructed and applied poultice we return again to our first principles — we support the part and we stimulate and equalize the circulation.

That form of antiseptic poultice which I prefer is made of sheet wadding pads wrapped in absorbent gauze and covered with some waterproof material like oiled silk or parchment paper. The pads are wrung out of a hot creolin solution, one in two hundred. You may use bichloride or boric acid, but carbolic acid never.

The poultices should do much more than cover the affected region only. If the whole *finger* is involved, wrap the *hand;* if the hand is involved, include the forearm in the poultice. Thus you will quiet the adjacent muscles and protect the efferent lymphatics. It is well also to put on a light splint outside of the poultice for more perfect immobilization.

Then as to the drainage of these abscesses — gauze wicking is usually sufficient. Do not *pack* the cut with gauze. That will cork up the pus. Gauze *packing* is never used except to check hemorrhage. To drain, lay gently into the cut one or two wicks or tapes. These will carry off by capillarity the secretions and, being interposed between the cut edges, will prevent a superficial gluing together of the skin wound and a consequent pocketing and burrowing of pus in the deeper parts.

To demonstrate further the treatment of felons let me show you a second case. This man has been aware of a throbbing pain, increasing in severity, for the past four days, over the middle phalanx of his ring finger. The primary cause of the trouble is unknown to him. You will observe that the whole finger is hot and swollen, and on compressing between your thumb and finger the lateral vessels on either side of his finger you plainly feel them throbbing. That is a distinctive and

interesting point in the diagnosis of localized inflammations of this type. You will not discover that pulse in the case of sprains or rheumatoid affections. This man's finger is not only swollen throughout, but its palmar skin is reddened, elevated, and excessively tender. Feel carefully in his axilla, and you detect an enlarged and painful gland. His body temperature is not elevated, his pulse is not rapid, nor is there a noteworthy leucocytosis, — the white count being 9,000; but he is tired from loss of sleep and weary with the constant pain. On carrying my knife deeply down through the skin and laying bare the tendon sheath, I give vent at first to an abundant bloody oozing, which is good. Then there follow half a dozen drops of pus, in which you will probably find streptococci in pure culture. If, now, I content myself with this cut and apply my dressing, to-morrow may show us the superficial parts mostly glued together. That is a condition we do not want, for the wound must be made to heal by granulation from the bottom. To favor such healing, trim off the skin edges so that they cannot readily be brought together — a simple and very useful manœuvre. Now we apply the poultice, light splint, bandage, and sling.

Properly the poultice should be changed twice a day at least, and by the fourth day we

should begin to see a clean, granulating wound. The man will have pain to-night probably, and may need a small dose of morphia. A certain amount of pain nearly always follows a cocaine operation on a felon, but by to-morrow he should be in comfort.

These two cases have been very simple ones, but all felons are by no means so easy of treatment. The pus burrows; tendons, bones and joints are involved; slashing incisions and amputations may be necessary, and at the best some impairment of function is very apt to ensue. Such results you shall see daily in this clinic. The therapeutic measures to be applied differ in degree only from those you have seen this morning. Pus is to be sought out, drainage is to be maintained, asepsis and support are vigorously to be enforced, pain is to be relieved and, always, the general condition of the patient is to be considered and strengthened so far as well may be.

You must look now at this third patient, who very conveniently presents us with an example of *paronychia*. In the limited sense in which we use the term, "paronychia" is the common nursery "run-round." This child, who brings it for our inspection, pulled a hangnail a few days ago until she drew blood, and so infection entered in. Day before yesterday the skin about the base of the nail was reddened

and painful, forming a crescentic swelling. To-day there is pus obviously present, for it shows creamy through the thin pellicle.

There is a common way, a common but wrong way, of opening these little abscesses. That wrong way is to cocainize the finger and draw the knife in a semi-circle through the skin about the base of the nail. So you will evacuate the pus, but you will have left an ugly sore, with the underlying nail at the bottom, to granulate slowly up.

Here is a better way. I lay this narrow-bladed knife, flat upon the nail with the knife point against the inflamed skin, and by a little gentle prying, which should be painless, I insert it along the skin edge and the base of the abscess. I withdraw the point, when you see it followed by a jet of pus. By a little manipulation the cavity is now evacuated, and a poultice is applied. Unless the nail and matrix have become involved in the inflammation, sound healing should now be a matter of two or three days only.

That was the simplest form of paronychia. If you carry away with you to-day no other information than of the little trick of opening it along the nail, your hour has not been wasted.

As in the discussion of felons, so here, I have scarcely more than touched upon the subject. This process may rapidly invade the finger. It

may attack and destroy nail and matrix, and involve periosteum, bone, joint, and tendon. There is no limit to its possible ravages, but for the avoidance of confusion, as I told you at the first, when the inflammation has passed beyond the region of the nail, I prefer to speak of it as felon and not as paronychia.

Palmar abscess is the third subject to be considered to-day. To it felon and paronychia naturally and inevitably lead. It is a lesion of great interest,— in its pathology, its treatment, and its capacity for far-reaching damage. In it the infection usually starts in the palm, but it may begin in one of the fingers and spread to the palm.

The methods of infection are therefore various, but perhaps the commonest method is that presented by the hard-working man whom I show you. He is a gardener. His hand bears heavy callosities, which have become so hard as to press upon and irritate the underlying soft structures. This bruising has caused a considerable blister, which has become infected from the overlying skin, and in turn has passed on its irritating properties to the deeper parts.

As you look at the hand it appears everywhere swollen — back as well as front. That puffy, reddened dorsum is swollen from œdema. If you were to cut into it, you would draw only serum and blood. But the palm shows a condi-

tion quite different. It is not so greatly distended in appearance as is the dorsum, for its deep structures, bound down by the dense palmar fascia, cannot greatly swell. The pain is there, however; and it is all the more severe because the fascia does so limit the swelling. In order to escape without our aid the pus must burrow up under the annular ligament, into the forearm, and that is what we fear. So you see the palm of the hand to be tense, brawny, but not greatly swollen. It is exquisitely sensitive to pressure. The pus must be let out quickly, and here again we are presented with a problem which is rendered interesting by reason of anatomical complications. No other region of the body contains so many and such diverse structures compressed into so small an area. There is here a labyrinth of tendons, nerves, vessels, and fasciæ — to say nothing of tendon sheaths, small muscles, and bones. All these structures are essential to the proper use of the hand — that wonderful piece of mechanism. We cannot go roughly slashing into it without crippling it, yet to get out the pus we must in a fashion slash.

It used to be taught as a safe rule, and those who so taught were in the main correct, that when cutting into the palm you should make your incisions short, multiple, and parallel to the bones, thus avoiding, so far as possible, the

delicate structures of the hand. That plan is not a bad plan — indeed, it is the one commonly followed still, but it has this disadvantage, that through these straight incisions the pus is sought somewhat blindly and with difficulty, and that the incisions tend to early closure, thus damming in the discharges and necessitating a second operation often. Moreover, such wounds heal with disabling scars, which are bound closely to the underlying parts and seriously limit motion.

My colleague, Dr. Brooks, has devised an incision which I prefer. The patient is now etherized. While his hand is held firmly outspread I outline a semi-circular flap which includes the whole of the palm practically. I enter the knife over the second metacarpo-phalangeal joint, as you see, and after sweeping round the palm I bring it out at the base of the thenar eminence; in other words, the flap is to be turned back on the thumb as a pivot. Rapidly dissecting away the skin, I have now exposed completely the palmar fascia. You see a little pus oozing through it at these three openings. I now enlarge the openings with a blunt scissors and rapidly, without damage to structure, follow up and clean out all the cavities. You see I have had to deal with a really beautiful and well-exposed dissection of the palm, I have avoided easily the important arteries, nerves and ten-

dons, for I have seen them; and I have searched out the burrowing pus far more thoroughly than was possible by the old blind method. Now I disinfect carefully the whole hand.

How about drainage and the after-treatment?

Wicks are led out from all the pockets; a thin layer of gauze is spread over the whole exposed surface and the skin flap is laid back over the gauze. In the subsequent dressings, when necessary, the skin flap may again be turned aside and the depths of the wound may again easily be explored. Judging by experience, we should find the inflammation subsiding in a day or two, when the wicks gradually will be removed. By the end of a week the palm and the under surface of the flap will be covered with granulations. Then, if all looks clean and sound, we shall stitch the skin back into place and look for a rapid healing by a delayed first intention. To facilitate the sewing back of the flap we usually pass these so-called provisional stitches at the time of the original operation. When the time comes they will be tied.

For the first four or five days it is well to dress the hand and forearm in a large creolin poultice with a splint, but this may be abandoned soon for the gauze dressing with elastic compression and elevation.

You will be surprised to see how useful and

comely a hand will result from all this. The scar will be there, of course, but it will not be especially troublesome, and the function of the hand will generally be much better than was the case when multiple linear incisions were used.

Again, let me warn you, in closing, that in spite of what I have said of your flap at the thenar eminence you must never operate by *rule of thumb*. Broadly this operation is a good operation, but diverse conditions will present themselves. No two cases are alike, and while you must strive always to observe general principles, you must apply also a broader common sense.

LECTURE VIII

BOILS, CARBUNCLES

Gentlemen: The treatment of boils may seem to you a very minor part of Minor Surgery, yet there are few curable conditions more troublesome than furunculosis.

Last winter there came to see me a man who is the chief of police in a neighboring town. He had upon the back of his neck two boils and the scars of half-a-dozen others. For four months he had been suffering from these pests, — in constant discomfort with a sore and painful neck; his sleep broken, his appetite impaired, and his health becoming undermined. On inquiry I learned that he had gone ten years without a day's vacation, and that for six months before the appearance of his boils he had been feeling run down and debilitated from that condition of faulty metabolism which we call muscular rheumatism.

I gave him a simple cleansing wash for the neck and a course of aperient waters. I enjoined a two weeks' vacation and the following tonic: sulphate of iron 3ii, sulphate of

magnesia 3vi, dilute sulphuric acid 3vi, syrup of ginger 3iv, water 3ix, — a combination which I borrowed from Dr. L. D. Bulkley, and have found very useful in such conditions. The dose is one teasponful in water after meals. To the boils I applied merely a soft protective cotton dressing. Ten days later the man wrote to me that his boils had disappeared and that he was feeling well.

That case illustrates one of the most important points I have to make for you in this connection. It is the point I have so often made for you before. You must regard your patient's general condition. And boils are usually a manifestation of a general condition. They indicate some form of malnutrition aud must be treated on that basis.

Billings' Dictionary defines a boil as "a painful conical or rounded swelling of the skin, due to inflammation about a hair follicle, a Meibomian gland, or a sweat gland." That is a fair enough definition, and if you will turn to page 172 of your Warren's "Surgical Pathology" you will find the nature of the process exhaustively described. The point of it all, so far as the clinician is concerned, is that the organisms normally present in the skin gain lodgment in some of the glands or ducts and then multiply. The active development of these colonies of bacteria produces small areas

of connective tissue necrosis. This necrotic portion acts as a foreign body, and nature proceeds to throw it off as a "core." The process of throwing it off gives rise to further inflammation, with the resulting pus formation and swelling. After the core is thrown off there remains a little pit, which must heal by granulation. So, you see, there are three stages in the life history of a boil, and each stage demands its appropriate treatment. There is the first stage, when we see only a small superficial pustule; the second stage, when we see a much larger mass — elevated, indurated, and painful, containing its core; and the third stage of a craterlike but subsiding swelling.

Most commonly a patient comes to you with a well-developed boil in the second stage and, in the neighborhood, two or three incipient boils or pustules. If the case is a chronic one, make up your mind about the patient's general condition, especially as regards diabetes and rheumatism.

This young man before us is a good example of what I am describing. He is a night watchman, whose daytime sleep is disturbed. He is given to rather excessive whiskey drinking, and is feeling pretty well done up. He has a poor appetite, constipation, a furred tongue, and is a striking type of the tired man who is burning the candle at both ends. I need not

trouble you with details of general treatment in his case except to say that I shall stop his liquor, and give him a course of Carlsbad salts, with five grains of Blaud's pill before his meals. Look now at the back of his neck. Here on the right side is a conical swelling the size of a silver "quarter." It is reddened at the center, where it is beginning to break down and soften, but everywhere else it is indurated. It is very tender to the touch, painful on pressure, and he says it "feels sore all round." To the left of it are these three little pustules, with reddened areolæ, each about half the size of your little finger nail. In the first place, as regards these incipient boils, let me tell you with much assurance that they may be aborted. The old-fashioned method was to poultice the back of the neck and bring the whole crop to a head. Don't do it. There are scoffers who will tell you that boils cannot be aborted. I doubt if they have tried faithfully any method. Here are two methods. You may prick the little pustule and wipe out the minute cavity with a probe dipped in pure carbolic acid. That often will suffice, but I have not found it so successful as the hypodermic injection of very small quantities of some strong antiseptic.

In the first place I cleanse this neck with soap and water and alcohol. Then I inject five or six minims of cocaine, in four per cent

solution, under the infected areas. Now into this anæsthetized zone, along the cocaine track, I inject, under each pustule, two minims of pure styron, — an ancient but efficient balsamic antiseptic. I prefer it to carbolic acid, because more thoroughly it permeates the affected tissues. The result of this injection is to destroy the active bacteria and to convert the infected area into an aseptic eschar. The immediate result, so far as the patient is concerned, is that the sense of burning and discomfort disappears in a few minutes; without further sensation the eschar will be thrown off and the little wound will heal up. Remember to use cocaine before these injections of styron, for the styron used without such preliminary treatment causes a few moments of very severe pain.

I am satisfied from a fairly wide experience with this method of aborting boils that it will usually be found successful. A young man came to me last winter who had pustule after pustule appear on his neck for a period of several weeks. Before I saw him, one of them had got ahead of us. It ran a severe course and had to be opened and curetted twice. Into the other incipient furuncles, — perhaps a dozen or more, as they appeared from week to week, — I injected styron and checked them at once. Finally with tonics and general treatment the malady subsided.

There is another method of treatment which our next patient illustrates. He is a medical student who kindly offers himself for our instruction. Two months ago he had a slightly septic finger, which healed without trouble, but he became "run down" and developed a crop of boils on his left arm. They were treated by his friends and the surgeons in various dispensaries, where he kept at his work. They were opened, injected, poulticed, time after time, but continually recurred until he became discouraged and his life became a burden. I had seen him several times, but was unable to check the process, and there seemed to be nothing for it but to send him away on a long vacation.

About ten days ago when he came here to consult me I determined to take a leaf from the book of my friend Dr. Burrell and try the effect of a carefully applied Gamgee dressing. At that time the forearm had on it three incipient boils and the healing scars of a half-dozen others. The arm was carefully disinfected, wrapped in absorbent gauze, and put up, from fingers to shoulder, in our wadding and millboard apparatus with firm compression. A sling, of course, completed the equipment.

That dressing was put on one Friday and remained undisturbed until the following Tuesday. I then removed it, to find the arm clean

and shrunken, the little red boils shriveled, and the old scars practically sound. As you see to-day, the patient is entirely well, no new trouble having appeared in the past week. I shall now allow him the free use of his arm. That was an interesting experiment, and certainly it shows in a most striking manner the ever-present value of our familiar first principles — support, immobilization, elevation.

When a boil has developed fully, or "come to a head" as the saying is, the treatment is very simple and obvious. There is then no special interest in it. You must open it and clean it out. Cocainize it first, of course, by one or two deep injections along its borders. You may make a conical incision or, what is better, you may excise a little cone at its apex, about half as large as a silver dime. This excision will usually bring with it the core. Then scrape the cavity clean and drain it with a bit of gauze. For a day or two a creolin poultice will be a great comfort to the patient; after that, until the wound is healed, our cotton dressing is convenient and comfortable. One little note here — never plaster a cotton dressing down with adhesive strapping. It is dirty and ineffective, compared with collodion, and the taking-off process is painful. The collodion dressing may always easily be soaked off with alcohol.

You will be told of sundry other methods of dealing with boils. One man will pin his faith to internal medication and ointments and another to poultices and the knife, but the fact is that you must treat each individual lesion according to the indications of the case. When you have had one or two boils yourselves you will have had a valuable lession. Here, as elsewhere in the practice of our art, remember that

"He jests at scars that never felt a wound."

When we come to deal with carbuncles, we have a quite different problem on our hands — different in the extent and gravity of the process, but not so very different in its causation and development.

Let me ask you in the first place to look at these two patients, who present us with carbuncles in two stages.

The first patient, a woman, has here below the occipital protuberance, and above the line of her hair, a conical swelling about the size of a silver dollar. As I part the hair and expose the swelling you notice that its apex has an excoriated look and that there are three little craters from which a drop or two of pus may be squeezed. The little mass is brawny to feel and is quite deeply seated. Take it as a whole, however, it resembles closely a boil, and

you might readily mistake it for one. It is a carbuncle in its early stages.

In comparison, the process in this man is much farther advanced. It is in the common location on the back of the neck, on the left side, below the line of the hair, and to look at appears to be as large as the top of a small tea-cup; when you come to handle it, however, it is found to be deeply seated, with a widely indurated base nearly as large as your palm about it. It is flattened at its top and has a half dozen little craters from which pus oozes and bits of white sloughs protrude. That is a large carbuncle beyond any mistake. Both patients are debilitated — the woman from a week's pain and discomfort, the man from nearly three weeks of a similar experience. Both cases are uncomplicated, so far as we can ascertain. The urines are free from sugar; both patients are in their prime and of previous good health.

If you have a properly developed curiosity you will ask, What is a carbuncle and wherein does it differ from a boil?

Billing's Dictionary defines carbuncle as "A circumscribed inflammation of skin and subcutaneous connective tissue, terminating in a slough." More than that, it is usually a gangrenous inflammation. It begins on the skin as does a boil, but it spreads much deeper

and, as you would expect, it is produced by the staphylococcus pyogenes albus and aureus. Do not confuse this process with anthrax, as did Billroth and the older pathologists. Anthrax has many of the appearances of carbuncle, but it is far more rapid, it has a wide reddened zone about it, it has not the characteristic elevated flattened surface, it is nearly covered with a gangrenous eschar, and it is caused by the bacillus anthracis.

Our characteristic carbuncle begins then as a superficial skin inflammation about a hair follicle or gland, and works rapidly downwards along the *columnæ adiposæ* into the connective tissue; there it spreads rapidly, involving other *columnæ* and other glands, pressing upwards all the time, elevating the overlying skin, finding numerous points of exit and causing extensive necrosis of the connective tissue which it involves. It is usually a local process, but very rarely it may destroy the dense aponeurosis of the underlying muscles and extend widely to other structures. When we find it in its usual seat on the back of the neck we need not fear it greatly, for tough structures limit it below, but when situated in regions of greater vascularity and more delicate composition, as on the cheek and lip, it may spread rapidly, cause serious disfigurement, and even threaten life.

Now, gentlemen, let me say a very decided word about treatment in these two cases before us. There is but one method for you, and that method is nearly always sure and final,— *excise* the carbuncle. Don't dally with applications and poultices or even with the old-time deep crucial incisions. They mean delay, if not extension, of the process. All this necrotic mass in each case has got to come out. If you poultice or incise you do not prevent a loss of substance — substance has already been lost. It is far better thoroughly to excise it at once.

Take as our best example the man with the large inflammation. He is etherized, for the operation is a considerable one, and the knife is carried cleanly and completely around the carbuncle, outside of the necrotic area. The blade bites down to the underlying fascia and the whole sloughing mass is dissected out. The bleeding is checked, the cavity packed with absorbent gauze and the wound left to granulate. When you look at the size of it you will exclaim perhaps that here is a needless sacrifice of tissue and that the resulting scar will be enormous. You will be surprised, in the course of two or three weeks, to see how the sound parts have come together, and how trifling, after all, will be the evidence left of the great wound. You will be interested also to hear the patient's own account of himself to-

morrow. The old *incisions* gave but little relief at the time; the *excisions* are followed by an almost immediate reaction; and when next this man comes in I expect to hear from him that he has passed a good night, has eaten a hearty breakfast, and is practically free from pain.

The woman I shall treat in similar fashion, but the resulting wound will be small and she will experience little inconvenience except from the loss of some of her back hair.

Don't coquette with a carbuncle. Cut it out as you would a cancer, and you will never regret it.

LECTURE IX

BUNIONS, INGROWING NAILS, CORNS, AND WARTS

Gentlemen : I have chosen for the subject of this exercise a little collection of seemingly trifling lesions; but to the victims they are not trifling and they are very often maltreated.

Bunion is a condition so frequently associated with hallex valgus that I am prompted to call your attention to an etymological jest. Hallex valgus, an extreme deformity and outward displacement of the great toe, was for centuries called *hullux valgus*. As such you will find it described in all the books on surgery. So far as I know, Dr. Robert H. M. Dawbarn, of New York, was the first to point out the error, and that was only last year. The word *hallex* is itself archaic. It means literally a *scoundrel;* and you shall search your dictionaries to find, at last, "Allex (hallex) in *Isid. Gloss.* est pollex pedis."

However all that may be, bunion is a good Greek word. A bunion is an inflamed bursa, situated usually to the inner side of the metatarso-phalangeal joint of the great toe, and if

it becomes inflamed it makes trouble. Folk who go barefoot or wear sandals do not have bunions, but if you put a foot into an ill-fitting boot and crowd it forward, the great toe will feel the impact and be thrown outward across the second toe. Sometimes the deformity is so extreme that the great toe appears to be at right angles to the axis of the foot.

When this deformity takes place, as you can readily see in the man here under inspection, the toe is partially dislocated at the metatarsal joint, and upon the knuckle so formed comes the constant pressure of the side of the boot. Here lies the bursa over the knuckle and, as a result of the pressure, it becomes irritated, thickened, and inflamed.

You see the condition is a compound one, both bone and bursa being involved. In this present case we have an advanced stage of the disease, and the operation which I shall now do will illustrate the anatomy.

I make a sweeping crescentic incision about the dorsal side of the joint, and this flap, which is four inches in diameter, I turn down upon the sole of the foot. The exposed bursal sac I next open and dissect out. You see it is distended with a flocculent fluid, and, as I expected, there is at its base a little opening, which leads directly into the joint. This has illustrated for us a point I intended to make

for you, namely, that you are never safe in operating hastily upon a bunion, for you cannot always tell beforehand whether or not it may communicate with the joint. Every surgeon has had patients come to him from ignorant "corn doctors," who have attempted to pare off one of these bunions, with a resulting opening of the joint and a severe septic arthritis. I hope it is needless for me to point out to you that our operation is being done under the strictest precautions.

Following up the sinus, I lay open the joint, of which the ligaments are so relaxed from the inflammation that their function is destroyed, the phalanx being in a state of subluxation. The joint cavity contains some of the fluid that we saw in the bursa and the articulating surfaces are roughened and diseased; in other words, we have shown that apparently simple thing called a bunion to be an extensive disease of bursa, joint surface, and bone.

There is no possibility of success from palliative measures in this case. The toe cannot be straightened even with the joint laid open. You can all see that the only thing to do is to excise the end of the metatarsal. This I do, accordingly, with the chain saw, and find that the normal line of the great toe now can easily be restored. The rest of the treatment follows naturally. Bleeding is checked, and the deep

parts over the joint are closed with buried catgut sutures, in order that the false joint at which we aim may have a firm lateral support. Those deep buried stitches are very essential for success. The skin flap is then stitched into place and the toe is held in its new straight position by a light tin splint. Over all is wrapped firmly a wadding and mill-board dressing to the knee, and the patient is put to bed. By the end of the week I shall take the dressing down and hope to show you a soundly healed wound.

This case was an extreme one. Hallex valgus has been its conspicuous feature, but here are a couple of simpler cases which admit of simpler treatment. Both have a slight outward bend of the toe and an inflamed tender bursa or bunion on the inner side. This first patient, the woman, has a toe which is easily pulled back into place. I shall content myself, for the present, with ordering a proper pair of broad, square-heeled laced boots, with straight sole on the inner side. Over the bunion I fit this piece of felt, cut like a large corn plaster. That will protect the bursa from pressure, and the properly made boot will allow the slight deformity of the toe to correct itself. These cases are frequently associated with a breaking-down of the longitudinal arch of the foot and a consequent flat-foot, but that is another story.

Our second patient, the man, has a hallex valgus and a bunion similar to the woman's, but the toe is not so readily pulled into place. For him I have had a hard rubber spoon splint arranged. The bowl of the spoon has a handle at either end. When the padded bowl is laid over the bunion, the upper handle extends along the side of the foot and the lower along the toe. Now with the upper handle strapped into place I pull the toe inwards toward the lower handle and so correct the deformity. By his wearing this simple apparatus for a few weeks, and by the fitting of a proper boot, I hope permanently to correct the deformity.

Another crippling affection of the foot is ingrowing toenail. This also is a disease peculiar to civilized peoples who are boot wearers, and is not seen in those who go barefooted.

Years ago an old army surgeon told me that he had no trouble with ingrowing toenails among his men after he had taught them how properly to trim their nails. They were to cut them straight across instead of making a rounded corner. I have found that simple manœuvre to be a valuable prophylactic measure.

The common seat of ingrowing nail is on the outer side of the great toe. As with bunion, it is due to ill-fitting or tight boots. This young woman illustrates the usual story. About a year ago she noticed that the outer side of

her toe began to feel sore. It was red and tender. To relieve the discomfort she trimmed the nail down on the side. That answered well enough for three or four days, but by the excision of that strip of nail the pulp was given so much the greater latitude for bulging inwards. It continued to encroach upon the nail, became irritated and eroded by the rough nail edge, took on the characteristics of a chronic ulcer, and threw out exuberant granulations, which now overlap that side. You see that the part is exquisitely sensitive to pressure, and that a little pus exudes from under the granulations.

Nothing short of an operation is to be done. Here palliation will be useless. There are two or three operations of value. I will tell you of two of them and then do a third.

Cotting's operation was devised by a well-known Boston doctor, recently dead. It consists of passing the knife, at right angles to the plane of the nail, into the pulp, and shaving off the whole of the soft parts together with a narrow sliver of nail on that side of the last joint of the toe. The wound is left to granulate and a contracted scar instead of normal pulp is the result. Ingrowing nail cannot occur again there, for there is no pulp for it to grow into. The operation is radical and effective, but leaves the patient with a sore toe for weeks.

Then there is a similar operation which consists of cutting out a "piece of pie" as it were from the pulp and sewing up the hole.

In this patient's case I prefer to do a good old operation which has the advantage of simplicity. The toe being cocainized, I seize the nail deeply and firmly with a strong pair of plying forceps, and twist it out entire; then I curette off the granulations. At the end of several months, when the new nail has grown out, the wounded pulp will have healed and shrunk, and the patient will then be as though no trouble had ever been. The operation is simple, the laceration is slight, and the resulting incapacity of very brief duration. A simple vaseline and gauze dressing is all that is required.

I must say one word, and an important word it is, about palliation in the incipient cases. Palliation means properly fitted boots and the packing of cotton under the nail. If you pack skillfully you may so treat a pretty bad case. Few men do so pack. Don't roughly and quickly thrust in the cotton. You will grievously hurt your patient and you will not get the cotton in. With the patient's foot on your knee, take a strand of absorbent cotton, lay it by the side of the nail, use the back of a narrow-bladed knife, and gently and patiently with a succession of pushes insinu-

ate the cotton under the edge. The patient will experience prompt relief. Repeat the performance once a week until you establish a cure.

I feel almost as though I should apologize to you for saying a few words about such trifling things as corns and warts, but you will be asked to treat them and you may be at your wits' end for a remedy.

A few months ago a young fellow from the college in Cambridge came to me complaining that he had run several splinters of wood into his foot when walking barefooted on the "float" at the boathouse. He had pulled out two splinters half as long as his little finger, but a third had been healed in and caused him constant pain in walking. I examined the foot and could distinctly feel the foreign body, as large as a medium penknife blade, deep under the skin at the base of the second toe. There seemed no reason to doubt the presence there of a splinter. I made an incision deeply into the foot and went down for nearly an inch through a stratum of tough callous, until I reached normal tissue. There was no splinter there. The seeming foreign body was nothing but a great callus, which I excised, and so cured the lad of his painful foot, — but I had learned my lesson.

This callosity was of the nature of a corn,

which is made up of a circumscribed excessive development of the epidermis and of a central portion or core. The core extends quite deeply into the tissues, in the form of an inverted cone, the base being directed outwards, appearing on the surface as a rounded area, the apex of the cone resting on the papillary layer of the corium and causing pain when pressed upon. In this case I performed a radical cure in the only manner which is possible, namely, by excision. Nothing else will do it. The "corn doctors" do not wish to cure. Their palliative measures merely relieve pressure for a time, but the patient returns repeatedly for further treatment.

After all, few patients will consent to so radical a measure as excision, especially with the prospect, if they are not careful, of a fresh corn developing about the site of the scar. So the sufferer comes back again and again to parings and plasters, and will continue so to do as long as boots are worn and corn doctors abound in the land.

Finally, as regards warts, there are several facts which you should bear in mind about them. There are four principal varieties: The ordinary horny warts of children (Verruca Vulgaris), the smooth multiple warts on the faces of old persons (Verruca Senilis), the little wormlike warts which we see hanging from the

lids (Verruca Filiformis), and lastly, venereal warts (Verruca Acuminata). There is reason to suppose that all these varieties are due to some infecting organism, though this is not definitely proven. The common wart of children, seen mostly on the hands and fingers, may appear and disappear in an inexplicable manner. It is composed of a papilla containing a vascular loop; this is covered by a very much thickened horny layer, which in turn is covered by an hypertrophied rete.

The little boy before us has three such horny warts on his fingers. One I pare down with a sharp knife and touch the base with the nitrate of silver stick; the second, after paring, I touch with nitric acid; and to the third I apply this mixture of salicylic acid, the important ingredient of most of the patent "wart cures." It contains salicylic acid, ʒss; cannabis indica, extract, gr. v; flexible collodion, $\overline{\text{ʒ ss}}$. This is painted on the wart twice a day for five days until the growth becomes necrotic. The finger is then soaked for fifteen minutes in hot water, when, if all goes well, the wart will drop off.

The soft flat warts of elderly persons are permanent and are not especially disfiguring, but they have this important fact connected with them, that they may become epitheliomata of a malignant type. The patient may pick at one until it bleeds, or he partially dislodges it,

when he finds that it does not heal; that the little ulcer, so formed, spreads, and that he is concerned with a troublesome sore. When you see such an affair, cut it out first, and then let the microscope settle its exact nature.

Those offensive looking filiform warts which you see hanging from the lids and necks of your patients may be very simply treated. A snip of the scissors and a touch with the lunar caustic suffice for them.

Then there are those venereal warts which are seen upon the genitals and are due to sexual contact. The patients are often much frightened and think the warts are indicative of serious venereal disease; but you can assure them that such is not the case. The growths will disappear if washed persistently with a solution of tannin in alcohol, one drachm to three ounces; the wart is then dried and dusted with salicylic acid.

After all is said, however, these various forms of warts seldom make trouble and their treatment may be regarded as a very subordinate branch of cosmetic surgery.

LECTURE X

MASSAGE

Gentlemen: We began this series of talks by describing the value and effect of immobilization.

In this final exercise I propose saying something of the value of *motion* in certain injuries, of motion in a limited sense only, — massage. That is a subject about which there has long been much misconception among surgeons, and even to-day this useful therapeutic measure is availed of less than it deserves.

Massage is no new, fanciful, or untried thing. It is one of the oldest practices in medical history, and is referred to not only by the earliest writers on surgery, but by poets who wrote long before medical literature began. If a boy bumps his shin he rubs it, if a dog bruises his foot he licks it. There you have nature prompting to a primitive massage, the uses of which have been elaborated into the skillful manipulations of our modern experts.

The practice was in bad odor for long in this country because of the preposterous claims of

its ignorant exponents and the frequent danger they inflicted upon unsuitable cases. In the course of years all that was changed: educated men, many of them trained in Sweden and France, took up the practice; the operators, both men and women, came to see that their work was as assistants to surgeons and not as their rivals, until to-day we find a considerable number of such competent persons in every community. Lately there has developed a curious outcome of these conditions. A so-called "school" of medicine has grown up. Its followers apply to themselves the meaningless term "Osteopathists" and they essay on their own responsibility various forms of massage. It is needless to say that these ignorant persons make serious errors and do harm, and doubtless they will reach the limbo where thousands of preceding charlatans lie buried; but meantime they bring real distress upon our honest massage friends, whose business they are cutting into, as I am told.

Students often ask me how they can learn about the methods of massage and whom they shall employ, and I find there is much misconception as to the limits of its usefulness. A common error also is to suppose that any nurse or orderly can learn to give it well after a short course of instruction. I believe, other things being equal, that the best masseuse may be

developed out of the trained nurse, but I must tell you earnestly that the best masseuse can remain the best only by constant practice. The tactile sense required is quickly lost if allowed to rust, and the strong, lithe muscles of the skilled workman become inexpert and feeble when long unused. Constant practice is as essential to the masseur or masseuse as to the pianist, the artist, or the football player. The professional model will pose immovable for an hour, if need be, before the "life class" in the studio; but I am told of the strong man Sandow being asked to pose in one of our art schools recently, and how, after enduring the strain for ten minutes, he was forced to drop his arm in exhaustion and chagrin. The average nurse can give excellent rubbings and friction when required, but when you want proper, expert massage, you must go to a specialist who does nothing else.

I have no intention here of giving you a dissertation on massage, nor have I the time or requisite knowledge; but I do wish to point out to you and to illustrate some of the conditions in which massage is of value in surgery. One of the commonest of injuries — an injury for long a reproach to our art — is sprained ankle. It was the practice up to ten years ago — and the practice is still followed by the indifferent — to immobilize sprained joints.

The result was that patients so treated were tied to crutches for weeks or months, the time depending on the severity of the sprain,— and after the splint and crutches were thrown aside they limped about as cripples for an indefinite period. It used to be a common saying that a man must expect to feel his sprain occasionally for the rest of his life, even if he be not left with a joint permanently stiff and painful. That such were the results sometimes seen, every surgeon of fifteen years' experience can tell you. A recent writer has said: "Supposing a prize of ten thousand dollars were offered for the quickest way to make a well joint stiff, what more effectual means could be resorted to than first to give it a wrench or sprain, and then do it up in a fixed dressing so that the resulting imflammation would have an opportunity of producing adhesions of the parts?"[1]

The man whom I now show you slipped from the curbstone and "turned his ankle" while running for a street car yesterday, and on rising found himself unable to stand or walk without agony. He was carried home and shortly after the removal of his boot found that his ankle was swollen, discolored, and very painful. This morning he came here on crutches for treatment.

The one important lesion which we have to

[1] "A Treatise on Massage," by Douglas Graham, M.D.

distinguish from simple sprain of the ankle is Pott's fracture — which you know to be a fracture of the fibula just above the malleolus, with eversion of the foot and rupture of the internal lateral ligament. Palpation in this case shows us no such fracture, and the x-ray plate which I have had taken demonstrates sound bones of the leg and tarsus.

But what do you see and feel? The foot is swollen and boggy, especially over the internal malleolus, and the skin is stained a pale yellow from extravasated blood and serum. Doubtless the man violently wrenched his foot, bruising the synovia of the joint surfaces, stretching and bruising the tendons and tendon sheaths, and tearing a few of the fibers of the lateral ligament. As a result there has been a certain amount of escape of blood from the damaged soft parts and a serous exudate, stimulated by the increased flow of blood to the part, in nature's primary attempt to repair damages. The exudate has infiltrated the tissues, with this resulting discoloration. As time goes on the exudate will settle out more and more towards the surface and the staining of the skin will become darker, until by the end of four or five days you shall see the skin over the dorsum deeply pigmented and the ecchymosis, following the tendons and muscle interspaces, appearing well up on the calf.

Here then is our problem: Shall we leave all this exudate to remain quiet and to organize and cause adhesions of tendon and joint surfaces, thus impeding the circulation and impairing the nutrition of the parts? or shall we endeavor to remove it and, by stimulating the circulation, promote repair and the reëstablishment of function? I have told you of the results of the former practice. The masseur will now demonstrate the alternative.

The patient's leg is bared to the hip, so that there shall be nothing to constrict or impede the circulation, as he lies upon the examining table. You see how the operator begins his manipulations gently and at a distance from the joint. I think it a pretty sight to watch the work of an expert. He kneads and rolls the muscles of the calf, urging always the return flow of lymph and venous blood away from the ankle. Shortly the circulation begins to improve. The puffy, indurated 'feel" of the leg is less pronounced and the pain diminishes in the area worked upon as the exudate is forced along into the lymph spaces where the stimulated current is beginning to take it up and carry it on into the general circulation. Gradually the manipulations are carried into the region of the damaged joint; the toes, the sole and the dorsum of the foot receive their share of attention, until as you see, we are now actu-

ally rubbing and kneading upon the joint itself, where half an hour ago the pain and tenderness were so great that the patient could scarcely endure the weight of my examining hand. Having thus kneaded and stimulated the parts, and diminished the pressure so that the painful distention is no longer so apparent, the foot is put up in a carefully applied flannel bandage, from toes to knee, and the patient allowed to walk with the aid of his crutches. You see he finds that he can now bear some weight upon his lame foot. This treatment will be repeated daily for a week or ten days, by the end of which time I hope to be able to discharge him practically well.

You must bear in mind that complications may be looked for in these injuries and may call for treatment. One of the commonest of them is acute articular rheumatism, in those persons who are given to that affliction; for you must remember that rheumatism, like tuberculosis, is wont to attack the parts weakened for resistance. I always bear this possibility of rheumatism in mind, and during the convalescence from sprains I forbid alcohol and look carefully to the patients' general condition, especially to his secretions. That question of tuberculosis is an important one also. We all know how frequently the development of a localized tuberculosis may be traced appar-

ently to some trauma, and I call your attention to the fact that a sprained joint, which remains unsound for long, especially when treated by the old-fashioned immobilization, gives us excellent conditions for the subsequent development of a chronic infection. You can well imagine how such a joint, illy nourished, anemic, with an impeded blood and lymph current, partially anchylosed and associated naturally with flabby, atrophied muscles, presents an admirable seat of lodgment for tubercle bacilli. The organisms, as you know, begin their destructive process first in the epiphyses of the bones, and from there proceed to involve the joint surfaces; so here again we find further reason in the case of fresh sprains for expediating a healing.

Another lesion which furnishes us with an opportunity for brilliant results from massage is dislocation. I have told you in a former talk of the value of massage in fractures, but in dislocation its use is even more satisfactory.

Here is a typical case for us — a man with a subcoracoid dislocation of the humerus. He is a stout man and the diagnosis is not immediately apparent. You do not readily make out the flattening of the deltoid and outward trend of the humerus away from the side, but if you will practise bimanual palpation of the axilla on both shoulders you cannot fail to establish the diagnosis. On the sound side, with one

finger below the coracoid process and the other high in the axilla, you can almost make the fingers touch through the pectoralis major, which alone intervenes. Try the same on the affected side and you will be surprised to find that, push as hard as you will, a great interval still separates your fingers. That interval is occupied by the head of the humerus, dislocated under the coracoid. The patient will be etherized at once and the dislocation reduced. To-morrow he will return for massage. For the first week this will be given for twenty minutes daily while the arm is supported motionless in a sling. The same method in general that we have seen employed on the ankle will be followed. Pain will quickly be relieved and the nutrition of the parts improved. After a week, gentle passive and active movements will be begun, and by the end of three weeks of such practice we hope to have established a cure.

That matter of combining movements with massage in these cases is an important one. You shall find, for instance, in old shoulder dislocations which have been reduced and subsequently immobilized for a long time, according to the ancient practice, wasting, weakness, and stiffness resulting. If then you attempt by massage to restore the parts you will succeed very likely in rendering the joint supple, but

you will not increase materially the size and power of the muscles. Faradism will then help, by causing muscular contractions, but you can accomplish the same thing by active and passive movements. So remember that in all these joint injuries your massage must be supplemented by movements, in order properly to restore normal function.

There are numerous other conditions in which massage is of the greatest value, especially in contractures and deformities left by old injuries or inflammatory processes which have subsided. In those cases patience and faith are often required for a long time, but the final results usually justify the treatment. As to the use of general massage after major operations and prostrating surgical affections, there is no time to speak except to say that I have employed it commonly in such conditions, and with the most gratifying results, for the secretions are thereby increased, the circulation improved, the appetite, sleep, and mental state stimulated, and the convalescence, after the patient's getting out of bed, materially and happily abridged.

Naturally you will ask me, In what conditions is massage contraindicated? That is a question which it is difficult to answer in general terms, but I may safely say this — that wherever an active tissue-destroying process

is established, such as cancer or tuberculosis, there local massage is very likely to do harm.

I am perfectly well aware, after what I have said, that you may take to prescribing massage freely for lesions of all sorts and conditions, and that you are likely to be grievously disappointed at times. Nothing but experience will remedy such trials, for you must learn to select your cases and beyond all else you must know that proper massage is not to be had for the asking. Bad massage is worse than no massage at all. Good massage is not always easy to find. This community of ours is crowded with the spurious article. Make sure always that you have secured the best, and you will have provided yourselves with one of the most valuable of therapeutic measures.

In concluding this little series of talks, gentlemen, let me remind you that good surgery, like good literature, has certain old, salient, well-established characteristics and that it is at the same time a progressive science. We in our generation have contributed asepsis to the art of surgery, and thereby we have made possible an enormous widening of the safety zone of the operative field. But, after all, sound judgment, the skill of a handicraftsman, accurate knowledge of anatomy, appreciation

of the nature of physiological processes, and a constant regard for the comfort of the patient are essential if you are to succeed in this most difficult, nerve-racking, exhausting, and fascinating branch of our profession.